# The Chemical Age

**A Weekly Journal Devoted to Industrial and Engineering Chemistry**

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*NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.*

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## A Year's Chemical Trade

THE Board of Trade returns for December contain also the returns for the whole year, and we are thus able to compare 1930 with its immediate predecessor and also with 1928. The comparison is far from pleasant. As compared with 1929, which was a period of quiet recovery, 1930 shows a diminution in the exports of chemicals, drugs, dyes and colours of £4,650,638 (from £26,617,229 to £21,966,591), and as compared with 1928 a diminution of £3,443,652 (from £25,410,243 to £21,966,591). We should have to go back some years to find a parallel to so serious a drop. Chemical imports have not fallen to the same extent, but the figures illustrate the general shrinkage. Chemical imports fell from £16,882,022 in 1929 to £13,568,135 in 1930, a loss of £3,313,887, while a comparison with 1928 reveals a loss of £1,811,822. Taking all the produce and manufactures of the United Kingdom, there is on the whole year a decrease of over 134 millions sterling in exports and of nearly 27 millions sterling in imports. The year 1930 will long be remembered as the "slump" year, not merely for Great Britain but for industry throughout the world.

The decrease in chemical exports is particularly marked in some cases. Tartaric acid, for example, has fallen between 1929 and 1930 from £142,702 to £92,494. The sulphate of ammonia overseas market, the growth of which in recent years has been remarkable, shows a decline from £5,620,802 to £4,419,300; coal tar products are down from £1,733,594 to £1,154,289, and glycerine (crude and distilled) from £425,929 to £304,680, the decline being still greater when compared with the £527,744 of 1928. Potassium compounds have remained fairly steady, but sodium compounds have declined from £3,854,159 to £3,279,667. Dyestuffs have not suffered as heavily as other branches (from £1,087,129 to £1,002,163), while painters' colours and materials, usually a strong section, have declined from £3,989,859 to £3,249,189.

It is impossible to lay one's finger on any single predominant cause of this world depression. It has come almost like an epidemic. And it is certain to go in the same way. The question is how soon or how late. For the moment, if one inquires among chemical firms, there are no immediate signs of the much hoped-for recovery. But there is a fairly general feeling that the recovery, when it does set in, will be rapid and may develop into a boom. Meanwhile, adverse influences persist. The latest example is Australia, a country that should be capable of absorbing a considerable bulk of chemical products from this country. Business, already difficult, is obviously made appreciably more difficult when nearly 120 Australian sovereigns are required to equal 100 British. This is but one of the many "snags" that meet people who are honestly striving to remain confident and reasonably optimistic, and they cannot be ignored. Anxious as the outlook is, it may at least be said that the chemical industry is holding its own as well as most, and that the situation is being and will continue to be faced with courage and resource.

## Two Vacant Places

WE record with sincere regret this week the passing of two well-known men who, in different spheres, will be greatly missed. The late Mr. Charles Page, the head of the well-known firm of Chas. Page and Co., London, had held for many years a high place in the chemical merchant community and lived to celebrate the jubilee of the firm he founded. During his career he had witnessed many changes in the chemical industry, particularly on the merchanting and distributing sides, and to the end he strongly emphasised the importance of the functions of the merchant in exploring the world for markets and generally in stimulating business. Mr. Page spent, particularly of late years, a large part of his time in the country, and had, indeed, the aspect and manners of a country gentleman. By his immediate business associates

and staff and by the larger commercial community of which he was an honoured member, he will long be remembered with affection and respect.

Mr. Frederick William Follows, whose death in his 92nd year is also announced, was the founder of the well-known engineering business of Follows and Bate, Ltd., of Manchester, and remained until March, 1920, its managing director. In the chemical industry, as well as in the paint and colour fields, the products of the firm have gained a high and wide reputation, and their mixing and grinding mills are among the most familiar in the industry. Although a very keen business man, Mr. Follows took a large part in the public life of the city and district with which he was associated. He was honoured as a venerable and public-spirited citizen, and his presence will be missed in many circles.

## Industrial Uses of Sugar

We learn from Dr. Edward R. Weidlein, Director of the Mellon Institute of Industrial Research, that the institute has lately begun a broad investigation into possible industrial uses for raw and refined sugar. The research will be carried on by a Multiple Industrial Fellowship that will be financed by the Sugar Institute, Inc., of New York, an organisation that represents the cane sugar refiners of the United States. The comprehensive programme of investigation will be supervised by Dr. George D. Beal, assistant director of the Mellon Institute, and Dr. Gerald J. Cox, senior industrial fellow. They and the scientists who will be under their direction in endeavouring to find and to develop uses for sugar in various industries will have the close advisory collaboration of Dr. Leonard H. Cretcher, the sugar specialist who is the head of the Mellon Institute's Department of Research in Pure Chemistry.

According to Dr. Weidlein, various studies made by private research workers have already indicated results of industrial promise, and these findings will be carefully studied in the laboratories of the Mellon Institute. Most of these proposals relate to applications for sugar in such technological practices as wood preservation, textile finishing, and the manufacture of adhesives. Sugar is thought to merit searching investigation as a basic raw material for employment in various branches of chemical industry. Four chemists, headed by Dr. Cox, have begun the initial scientific research, and additions will be made to this staff, as needed, from time to time.

## The Friends of Economy

"The Friends of Economy," a group formed so that shape may be given to the growing public demand for a halt in national and local official extravagance, is not to exist merely on paper. Our readers will welcome the impetus given to the cause of national economy by the announcement of an economy demonstration in the City of London, which will add one more to the great national causes in which the City has taken the lead. The demonstration is to be held at the Cannon Street Hotel, London, on Tuesday, January 27, at three o'clock. The chair will be taken by Mr. E. C. Grenfell, M.P., and addresses will be given by Lord Grey of Fallodon, Sir Robert Horne, and Sir Ernest J. P. Benn. Already the promoters of the movement have received assurances of an immense volume of support.

In a circular calling attention to the demonstration, the joint secretaries to "The Friends of Economy," Mr. Archibald Crawford, K.C., and Mr. Herbert Fisher, state that the most urgent national need is public economy, and that without drastic reduction in national and local government expenditure Great Britain will move inevitably to disaster. A great national campaign for economy is a first essential, and the opening shots in that campaign will be fired on January 27.

### Books Received

Phosphates and Superphosphates. By A. N. Gray. London: International Superphosphate Manufacturers' Association. Pp. 276.

Rationalisation. By James A. Bowie. London: Sir Isaac Pitman and Sons, Ltd. Pp. 36. 1s.

The Manufacture of Artificial Silk (Rayon). By E. Wheeler. London: Chapman and Hall, Ltd. Pp. 178. 12s. 6d.

Industrial Britain, A Survey. By Albert Wilmore. London: George G. Harrap and Co., Ltd. Pp. 366. 5s.

Chemical Problems and Calculations. By R. H. Gibbs. London: Edward Arnold and Co. Pp. 160. 4s.

## The Calendar

| Jan. | | |
|---|---|---|
| 19 | University of Birmingham Chemical Society: "Modern Work on Organo-derivatives of the Elements." Professor F. Challenger. 5.30. p.m. | Chemical Lecture Theatre, Edgbaston, Birmingham. |
| 19 | Society of Chemical Industry and Institute of Chemistry (Yorkshire Sections): "Synthetic Resins." W. H. Nuttall. 7.15 p.m. | Great Northern Hotel, Leeds. |
| 20 | Newcastle Chemical Industry Club: "Some Notes on a Visit to Sweden." R. D. Burn. 7.30 p.m. | 5, Lovaine Row, Newcastle. |
| 20 | Institute of Chemistry (Bristol and S.W. Counties Section): Joint Meeting with Bristol University Chemical Society. Address on Professional Matters. 5.15 p.m. | University, Bristol. |
| 21 | Society of Chemical Industry (Glasgow Section): "Crystal Structure and Chemical Action." Professor C. H. Desch. | Glasgow. |
| 21 | Society of Glass Technology. 2 p.m. | County Hotel, Newcastle-on-Tyne. |
| 21 | Society of Dyers and Colourists (Midlands Section): "Fine Structure of Artificial Silks in Relation to Dyeing." A. J. Hall. 7.30 p.m. | Derby Technical College. |
| 22 | Institute of Chemistry (Belfast Section): "D. O. R. A.'s Grandmother." Dr. J. Hawthorne. 7.30 p.m. | Royal Belfast Academical Institution, Belfast. |
| 23 | Institute of Chemistry (South Wales Section): "Briquetting." Dr. R. Lessing. 7.30 p.m. | Thomas's Café, High Street, Swansea. |
| 23 | Chemical Engineering Group: "Modern Grinding." J. C. Farrant | Derby. |
| 23 | Society of Chemical Industry (Nottingham Section) and Chemical Engineering Group: "Modern Grinding." J. C. Farrant. | Derby. |
| 23 | Institute of Fuel: Presentation of the Melchett Medal and Melchett Lecture: "The Calculation of the Thermal Characteristics of Regenerators." Dr. Rummel. 6.30 p.m. | Institution of Civil Engineers, Great George Street, London. |
| 26 | Royal Society of Arts: "Some Modern Developments in Microscopy." Dr. L. C. Martin. 8 p.m. | John Street, Adelphi, London. |
| 27 | Institute of Chemistry and Society of Chemical Industry (Edinburgh Sections). 7.30 p.m. | 36, York Place, Edinburgh. |

## The Late Mr. F. W. Follows

### Man of Wide Interests

We regret to announce that Mr. Frederick William Follows, the founder and, until March, 1920, managing director of the well-known firm of Follows and Bate, Ltd., Manchester, passed away at his home in Manchester early on Monday morning, in his 92nd year.

Mr. Follows was born of Quaker stock on July 30, 1839, and the fact that he was able to maintain vigorous interest in the company's business affairs up to the advanced age of 82, when he finally retired, was looked upon as a striking instance of the adage that hard work does not kill.

In business Mr. Follows was, in his day, one of the best known commercial and public men, and a most picturesque personality, with a genius for devising and marketing all kinds of domestic labour saving machinery, as well as heavier machines for the paint, colour and chemical trades. He is remembered by his employees as a "governor" of the old school, who took a kindly personal interest in every one of them, old and young, always insisting upon and helping the younger ones to secure adequate technical education.

Mr. Follows' activities included interests of a wide and varied character. An enthusiastic Liberal in politics, he was an old member of the National Liberal Club, London, and the Reform Club, Manchester, and was frequently heard on the platforms of such well known candidates as the late Sir William Mather and others. He took an intense interest in education, particularly on the technical side, and served for many years as a co-opted member of the Manchester Education Technical Sub-Committee. Mr. Follows was one of the original trustees of the Whitworth Institute; he served with much activity on the committee of the Manchester Jubilee Exhibition in 1887, and was a well-known exhibitor year after year at the annual shows of the Royal Agricultural Society of England, the Royal Lancashire Agricultural Society, and many others. An old member of the Manchester Association of Engineers, he was a strong supporter of the movement for the construction of the Ship Canal. Industry, energy, and unselfish citizenship marked his long and useful life.

## Increasing Use of Gypsum

### Introduction of New Products

Several new products, consisting primarily of gypsum, have recently been introduced, and may lead to an increasing use of this material. An extremely hard dense plaster, suited primarily for architectural casting, was lately placed on the market. In the United States producers of gypsum products have developed a wall board that may be bent or folded to conform to structural needs. Gypsum lath that folds and is more or less flexible so as to simplify its application to intricately designed interior structures is also a new development. A new method for fastening wall board and lath to steel structural members has been devised. Considerable research work has been done to develop acoustical wall boards, and gypsum acoustical ducts that prevent the transmission of sound through ventilator shafts are on the market. Some companies are now producing artificial travertine, using gypsum as the principal material.

A process has been patented for casting concrete objects in porous plaster moulds. The plaster moulds absorb a considerable portion of the water in the concrete mixture, resulting in a concrete object of great strength. The manufacture of white cements having excellent cementing properties from anhydrite is receiving considerable attention, and points the way to the economical use of enormous tonnages of material now considered waste. Cements made by patented processes develop strengths of 500 to 550 pounds in 24 days and 800 pounds in 28 days, and are hard enough to take a high polish. It is said that they can be calcined at fuel costs comparable with present practices in calcining ordinary gypsum.

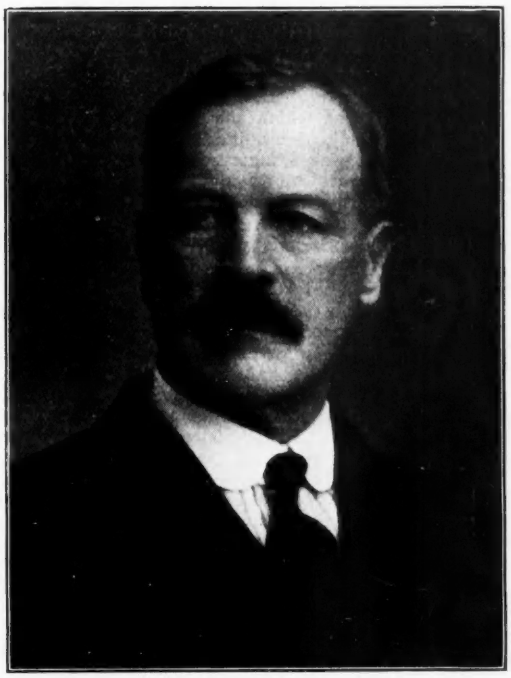
In the United States the manufacture of gypsum lumber has made considerable progress, and it is reported that the future of this gypsum product is very promising. Statistical data regarding the gypsum industry is contained in the United States Bureau of Mines report, "Gypsum in 1929," by R. M. Santmyers and Jefferson Middleton, which may be obtained from the Government Printing Office, Washington, D.C.

## The Late Mr. Charles Page

### A Pioneer Chemical Merchant

The news of the death on January 7, 1931, of Mr. Charles Page (head of the well-known firm of Chas. Page and Co.) at the age of 76 years at his residence, Durrant House, Rye, Sussex, will be received with deep and general regret by his many friends in the chemical industry, not only in this country, but on the Continent. The funeral took place at Rye Cemetery on Saturday, January 10. He leaves one son, Mr. C. M. Page, F.R.C.S., D.S.O.

Mr. Charles Page was born at Cheltenham on December 29, 1854, and was educated privately. His commercial activities commenced on November 1, 1880, when he founded the firm of Chas. Page and Co., chemical merchants, etc. He was the proprietor of the original company, and in 1918, when the business was converted into a private limited company, he



became chairman. Under his leadership, extending over a period of fifty years, the business rose to a position of eminence in the chemical industry in this country, with important connections throughout Europe and America. On account of the wide ramifications of his business, Mr. Page had travelled extensively in all parts of the world. He was made a member of the Junior Carlton Club, and a member of the executive council of the British Chemical and Dyestuffs Traders' Association, Ltd. The passing of Mr. Page breaks one of the few remaining links with the pioneer days of the merchant agent trading in chemicals, in which he was an outstanding and highly respected personality.

### British Tintex Sales Agreement

The directors of British Tintex and Dye Products, Ltd. have concluded an agreement with J. C. Eno, Ltd., manufacturers of Eno's Fruit Salt, under which that company will take over the home sales organisation on a commission basis. Another agreement has been entered into with British Harold F. Ritchie and Co., Ltd. (a company closely allied with J. C. Eno, Ltd.), to take over the management of the factory and sales organisation in Australasia.

The directors have decided to make up the next accounts at March 31 next, covering a period of fifteen months. Substantial economies have been effected in overhead charges, and directors' fees will be waived for the year 1931. Mr. Vernon Dunhill and Mr. E. J. Allisstone have resigned their positions as directors owing to the business of Alfred Dunhill, Ltd., requiring their whole time services.

# Solvents for Cellulose Lacquers

## Paper Before Oil and Colour Chemists' Association

*A paper on solvents for cellulose lacquers, with particular reference to methods of classification, was read by Dr. T. H. Durrans at a meeting of the Oil and Colour Chemists' Association in London, on Thursday, January 8.*

DR. DURRANS pointed out that it has been customary for a long time to classify solvents as "low," "medium" and "high" boilers, a classification which, although a step in the right direction, suffered from two serious defects. First, no hard and fast limits to the classes could be made, and, secondly, the boiling point of a solvent was not a sure guide to its volatility at the temperatures at which it was normally used—*i.e.*, atmospheric temperature.

In addition to vapour pressure, there were other factors which affected the rates at which liquids evaporated, the most important being the latent heat of evaporation, the specific heat, the conductivity for heat, the viscosity, the surface tension and the molecular weight of the substance, whilst external factors which also governed the rate were the humidity of the atmosphere, the rate at which the heat was supplied and the rate at which the vapour was removed. Attempts had been made to determine the rates of evaporation by actual test, but it was a matter of great experimental difficulty to obtain scientifically comparable results, and Dr. Durrans said he had not yet seen any method proposed which was not open to serious objection. Many of the results which had been published he considered were very doubtful.

As the influence which one component of a lacquer might have on the others does not appear to have been sufficiently appreciated, the paper went on to consider the interplay between the various components commonly employed. Considering first the influence of two miscible volatile liquids on each other, it was pointed out that theoretically a "medium" boiler would reduce the vapour pressure, and, consequently, slow up the rate of evaporation, of a "low" boiler more than would a similar weight of a "high" boiler. In many instances, on mixing two liquids azeotropic mixtures were formed which had boiling points below those of the two components. The same phenomena could be observed at temperatures below the boiling point, the vapour pressure increasing to a maximum and then diminishing to a lower value as the addition proceeded. Unfortunately, although there were recorded a large number of azeotropic mixtures of lacquer solvents, the figures all related to conditions obtaining at boiling points and not to those at normal temperatures, which would be of greater value technically.

### Azeotropic Mixtures

Azeotropic mixtures having three miscible components were known, but they were relatively few in number, and although theoretically there appeared to be no reason why the number of components should not be still greater, there was no accurate record of a four-compound azeotropic mixture. In actual practice, azeotropic mixtures had effect in several ways. First, the increase of vapour pressure which accompanied the formation of an azeotropic mixture had a large influence on the flash point of a mixture. Secondly, the proportion for maximum explosivity would be reached at a lower temperature. Thirdly, the increase in vapour pressure would result in a higher rate of evaporation, and might cause chilling or other defects due to excessive rates of evaporation. Fourthly, the formation of an azeotrope might affect the solvent power of a mixture, and, lastly, the formation of an azeotrope affected the relative rates at which the components of a mixture evaporated. It became advisable, therefore, when using a non-solvent diluent to choose the solvent so that either no azeotrope was formed or, if it were formed, that it should be one having a higher proportion of non-solvent than solvent, in order that the non-solvent might be removed more rapidly than the solvent; otherwise, cotton blush or gum blush might occur if the percentage of these ingredients were too near to the saturation point of the mixture.

Discussing "medium" and "high" boilers and comparing their efficacy, Dr. Durrans said that, owing to the desirability for eliminating the solvent as far as possible in the earliest stages of the life of a cellulose film, resort should be had to "medium" boilers of low molecular weight rather than to "high" boilers of high molecular weight. It had been the practice in some cases to use the latter to obtain a plasticising effect, relying on the small quantity of high boiler which might remain, but Dr. Durrans said he regarded this as bad practice, as it must lead to films which altered in character with age. Solvents boiling over the range of 150–250 deg. C. should be avoided. At the same time this was not easy to do where cellulose acetate was concerned, as there was a deplorable lack of good solvents in the "medium" boiler range. It was to be hoped that a suitable solvent for cellulose acetate having a boiling point similar to that of butyl acetate would soon be available. The most promising solvent in view was dioxane or 1 : 4 diethylene oxide. At the present moment, however, the most suitable were diacetone alcohol and ethyl lactate.

Passing to the higher boilers, the plasticising or softening solvents, it was pointed out that during the last few years considerable progress had been made in the production and scientific use of plasticisers by reason of a better understanding of the phenomena involved. A point of great practical importance was that of the proportion of plasticisers that should be used with the cellulose ester. It had been customary to speak of the plasticiser dissolving the cellulose ester, but it would seem more correct to say that the cellulose ester dissolved the plasticiser.

### Plasticisers

The opinion was generally held that solid plasticisers such as triphenyl phosphate were not suitable, since they tended to crystallise out of the film. This was only true, however, when the critical solution temperature was above the atmospheric and the proportion of plasticiser was in excess of that which could be held in stable solution at atmospheric temperature. If this proportion were exceeded the system was unstable, and the plasticiser, be it solid or liquid, would separate. Solids such as triphenyl phosphate under such conditions gave cloudy films having a wax-like surface, whilst liquids such as amyl stearate gave oily deposits. When such undesirable phenomena were experienced, the remedy was to reduce the proportion of plasticiser or to add another plasticiser, the critical solution temperature of which was well below the atmospheric, such as triacetin.

Two other points of some practical importance not generally appreciated were, first, that a plasticiser which was in homogeneous solution in the cellulose ester was more permanently fixed that one which was not; secondly, the viscosity of a lacquer solution was, within limits, lowered by the addition of a soluble plasticiser, but it might actually be increased by a substance for which the cellulose ester was not a solvent.

Another important function of the plasticiser was to bring the cellulose ester into homogeneous solution with the resins that might have been added. Considering the most usual pair, cellulose nitrate and ester gum, it should be realised that these had no solvent action on one another, and in the absence of a common solvent, a non-homogeneous film of inferior strength resulted. Frequently, enough "medium" or "high" boiler was retained to render the mixture homogeneous for a period, but if permanence was to be obtained it was desirable to have present a plasticiser which was a solvent for both the cellulose ester and the resin.

### Solvents and Viscosity

Speaking of the influence of the various classes of solvents on viscosity, the author said that in general it was probably best to have a lacquer the viscosity of which increased at a more or less uniform rate as the solvents evaporated. The viscosity of a solution might in general and within limits be increased by substituting diluent for solvent, but inasmuch as a mixture of two non-solvents might occasionally function as a solvent, no hard and fast rule could be stated. This was one of the reasons why the addition of a non-solvent sometimes initially increased the viscosity of a solution, whilst a further quantity of non-solvent resulted in increased viscosity and, finally, in precipitation of the cellulose ester. As a general

conclusion on this aspect of the subject, Dr. Durrans said it was possible to control the flow of a lacquer to a great extent throughout all periods of drying.

Consideration was then given to solvents which were miscible in water, such as acetone, diacetone alcohol, ethyl lactate and cellosolve. Whether this was a desirable property or not depended on circumstances. Water could be regarded merely as a non-solvent diluent such as benzine and toluene or the paraffins. Whilst we most carefully excluded minute traces of water from solvents such as butyl, ethyl and amyl acetates, we gladly accepted them containing several per cent. of other diluents, *e.g.*, the corresponding alcohols, and, indeed, it had been shown that such diluents were distinctly advantageous. It seemed, however, that the present trend of the lacquer industry was on the wrong track, and that we were making a fetish of high ester content and freedom from water. In America, water was being used to replace the usual but more expensive diluents, and this was where the water miscible solvents scored. If we had a lacquer in which the amount of diluent approached the maximum permissible, then the addition of more diluent, be it hydrocarbon, alcohol or water, in sufficient quantity would cause precipitation. This was precisely what happened when chilling took place—the non-solvents were in excess locally, generally on the surface of the film. If the lacquer contained a sufficient excess of solvent, chilling would not occur. Where the limiting proportion of non-solvent diluent had already been added, the introduction of more diluent by decomposition from the atmosphere would cause precipitation or chilling. In these circumstances it was better to have a solvent which was not capable of dissolving water, as any action was then limited to the surface and was transient. The moral, therefore, was not to use large proportions of water miscible diluent, such as alcohol, with solvents which were capable of dissolving any considerable quantity of water, but in any case the quantity of diluent should be limited so as to leave room for more diluent in the shape of water deposited from the atmosphere.

### Qualities of Solvents

In a general summary, the qualities of the various solvents were stated as follows :—1. Low boiler, of high solvent power to enable concentrated solutions of low viscosity to be prepared and to obtain quick initial drying. 2. Medium boiler, to check the rate of evaporation, and thus to reduce defects caused by excessive rates, also to impart good flowing properties. 3. High boiler, to protract the period of drying for long periods, and thus to impart good brushing properties and gloss. 4. Plasticiser, to knit all the solid constituents into a homogeneous whole, to impart flexibility, permanence and gloss and to reduce brittleness. 5. Diluent, to reduce cost and to control viscosity.

Finally, the author put forward some ideas regarding a method for producing a lacquer having predetermined properties. The method proposed was a development arising out of work by the American chemists, Hoffman, Reid and Stoppel, and was explained by means of a three-dimensional graph, taking as an example the production of the cheapest possible lacquer, having 10 per cent. of a certain quality of cellulose nitrate dissolved in a mixture of "low" boiler, "medium" boiler and diluent and having a definite viscosity and blush resistance.

### Discussion

Mr. T. Hedley Barry asked whether there was any danger of the solvents of the film reabsorbing moisture and ultimately affecting its durability. That process, if repeated, might have a very bad effect on the film.

Mr. H. J. Stern said it was particularly interesting that solvents should persist for some time in a film. Could the lecturer give them any information as to the time taken before they became stable? With regard to water solvents, when one came to think of it, the more water one put in, other things being equal, the better. There were, unfortunately, certain other disadvantages in connection with water. There was the practical influences of the water on the other substances present, as, for instance, in the case of lacquer used for bronze powders, where there was discolouration.

Mr. C. W. Richardson said he had always understood that the presence of small quantities of impurities would materially affect vapour pressures. It seemed to him, if such were the case, it was going to be an appalling task to get down to a commercial basis on the question.

The Chairman, Mr. Noel Heaton, said he thoroughly endorsed the criticism of the custom of classifying solvents as low, medium or high boilers, which had always been unscientific. There was the same thing in the paint industry in the classifying of pigments by their chemical instead of their physical properties.

Replying to the discussion, Dr. Durrans said he had actually observed the phenomenon of a dried film absorbing moisture from the air. The plasticity of cellulose ester films varied with the humidity of the atmosphere. It seemed feasible that the bombardment of the surface of a film by moist air might easily lead to the absorption of water, especially if a solvent miscible with water were present. Such action would doubtless be deleterious. Regarding the retention of solvent by dried films, the author instanced a case where the smell of amyl acetate was quite perceptible on stripping a film from a metal surface five years after application. The use of water as a diluent in a lacquer was not to be recommended if the solvents were not stable to water. For that reason the use of esters of formic or oxalic acid was generally to be avoided. In reply to Mr. Richardson, the author said that it was possible to use graphical methods for more than three components, but as it virtually involved the fourth dimension it was a matter of considerable complexity.

## Science Masters' Association

Two addresses of chemical interest were delivered at the second day's meeting of the Science Masters' Association, at the University of Birmingham on Wednesday, January 7. Professor Nash, Professor of Petroleum Technology at the University, who lectured on the work of the chemist in development of the petroleum industry, said a distinguished chemist in the industry had stated that the addition to the staff of a large petroleum company of skilled chemists and physicists was not a luxury, but a profitable undertaking commercially. He estimated that the saving in cost on certain refining processes due to the work of these technological research men had covered the expense of the large research stations of these companies many times over.

"An insight into Complex Molecular Structures" was the subject of a lecture by Professor W. N. Haworth. A century ago, he said, a belief in the intervention of vital force for the synthesis of products of animal and vegetable origin obscured the mind of organic workers in this field. Appalled by the complexities of life products and the dearth of the experimental methods which might lead to the elucidation of their internal structure, the chemist of those days concentrated for the most part upon products of mineral origin. A change came when it was recognised that the products of organic life obeyed the general laws of atomic combination, and the events of the intervening period must for all time be regarded as a most amazing history of progress in which organic chemistry has paid a leading part.

## J. M. Newton Vitreo-Colloid (1928), Ltd.

THE statutory meetings of the creditors and of the shareholders in the compulsory liquidation of J. M. Newton Vitreo-Colloid (1928), Ltd., Kingsbury House, King Street, St. James's, London, were held on January 7 in Bankruptcy Buildings, Carey Street, London. The Official Receiver said that, according to the company's statement of affairs, the total of the liabilities was £53,395, of which £53,117 were expected to rank, and there was an estimated surplus in assets of £9,315 as far as the creditors were concerned. With regard to the shareholders, however, a deficiency of £240,785 was disclosed.

The company was incorporated as a public company in June, 1928, with a nominal capital of £250,000, its object, among other things, being to carry on the business of manufacturing and selling an acetate composition for use as a substitute for celluloid, glass or similar articles. The article manufactured by the company appeared to be excellent. The Official Receiver added that, in his opinion, the failure of the company had been caused by mismanagement.

The meetings resulted in a resolution being passed for the appointment of Mr. H. C. Waddington, Trafalgar House, Waterloo Place, London, as liquidator, and a committee of inspection was also appointed.

# British Overseas Chemical Trade in December

## Contrast with Close of Previous Year

THE Board of Trade Return of British Overseas Chemical trade for December shows that exports declined slightly from the November figure and remained near £1,500,000, but this is over one million pounds lower than the figure for the corresponding month of the previous year. December, 1929, closed on an optimistic note, with over half a million increase in exports over the 1928 figures. Imports last month were £1,137,232, a decline of £353,949 on the corresponding figures of 1929, and re-exports at £72,596 dropped over £8,000. On the full year there have been declines of £3,313,887 in imports, £4,650,638 in exports and £1,139,523 in re-exports compared with 1929.

### Imports

| | Quantities Month ended December 31, 1929. | Quantities Month ended December 31, 1930. | Value Month ended December 31, 1929. £ | Value Month ended December 31, 1930. £ |
|---|---|---|---|---|
| CHEMICAL MANUFACTURES AND PRODUCTS— | | | | |
| Acetic Anhydride.. cwt. | tons | — | 80,599 | — |
| Acid, Acetic..... tons | 2,236 | 594 | | 21,933 |
| Acid, Tartaric .....cwt. | 2,517 | 5,869 | 17,394 | 28,705 |
| Bleaching Materials ,, | 11,710 | 9,513 | 15,644 | 10,364 |
| Borax..... ,, | 39,787 | 23,535 | 24,053 | 14,283 |
| Calcium Carbide... ,, | 114,122 | 106,797 | 64,581 | 66,784 |
| Coal Tar Products.value | — | — | 95,035 | 16,852 |
| Glycerine, Crude ...cwt. | 101 | 95 | 200 | 188 |
| Glycerine, Distilled ,, | 796 | 2,384 | 1,778 | 5,251 |
| Red Lead and Orange Lead ..... cwt. | 3,559 | 4,572 | 5,511 | 6,167 |
| Nickel Oxide..... ,, | 87 | — | 477 | — |
| Potassium Nitrate (Saltpetre)..... cwt. | 14,413 | 5,003 | 14,180 | 4,986 |
| Other Potassium Compounds .....cwt. | 254,443 | 164,905 | 75,075 | 58,067 |
| Sodium Nitrate .. ,, | 79,822 | 127,660 | 35,699 | 54,472 |
| Other Sodium Compounds ..... cwt. | 42,641 | 29,420 | 27,642 | 20,012 |
| Tartar, Cream of ,, | 2,810 | 3,652 | 13,867 | 15,255 |
| Zinc Oxide ..... tons | 983 | 571 | 27,847 | 14,558 |
| All other Sorts ... value | — | — | 313,113 | 219,452 |
| DRUGS, MEDICINES, ETC.— | | | | |
| Quinine and Quinine Salts ..... Oz. | 175,626 | 109,880 | 11,832 | 7,510 |
| Bark Cinchona (Bark Peruvian, etc.) ..cwt. | 1,981 | 3,921 | 9,114 | 18,648 |
| Other Sorts .....value | — | — | 272,189 | 203,664 |
| DYES AND DYESTUFFS— | | | | |
| Intermediate Coal Tar Products ..... cwt. | 203 | 71 | 2,255 | 784 |
| Alizarine ..... ,, | 172 | 57 | 5,609 | 2,926 |
| Indigo, Synthetic ,, | — | — | — | — |
| Other Sorts ..... ,, | 4,001 | 3,011 | 84,159 | 65,642 |
| EXTRACTS FOR DYEING— | | | | |
| Cutch ..... cwt. | 2,473 | 2,354 | 4,081 | 3,966 |
| All other Sorts ... ,, | 3,599 | 2,776 | 10,888 | 9,919 |
| Indigo, Natural .. ,, | 27 | 7 | 715 | 200 |
| Extracts for Tanning ..... ,, | 92,950 | 99,884 | 93,600 | 100,012 |
| PAINTERS' COLOURS AND MATERIALS— | | | | |
| Barytes, Ground cwt. | 55,290 | 37,906 | 11,537 | 7,175 |
| White Lead (Dry) ,, | 17,141 | 12,857 | 30,711 | 19,208 |
| All other Sorts .. ,, | 108,160 | 109,036 | 141,796 | 140,249 |
| Total of Chemicals, Drugs, Dyes and Colours....value | — | — | 1,491,181 | 1,137,232 |

### Exports

| | | | | |
|---|---|---|---|---|
| CHEMICAL MANUFACTURES AND PRODUCTS— | | | | |
| Acid, Sulphuric .. cwt. | 8,608 | 16,032 | 4,116 | 4,788 |
| Acid. Tartaric.... ,, | 2,234 | 1,821 | 16,987 | 9,817 |
| Ammonium Chloride (Muriate) ..... tons | 286 | 211 | 6,222 | 3,357 |
| Ammonium Sulphate— | | | | |
| To Spain and Canaries tons | 26,029 | 7,353 | 238,858 | 51,458 |
| ,, Italy..... ,, | 598 | 226 | 5,479 | 1,615 |
| ,, Dutch East Indies tons | 13,133 | 4,453 | 125,337 | 32,957 |
| ,, China (including Hong Kong) tons | 10,078 | 3,598 | 97,758 | 26,965 |
| ,, Japan..... ,, | 18,517 | 1,000 | 174,302 | 7,500 |
| ,, British West India Islands and British Guiana tons | 205 | 512 | 1,817 | 3,718 |
| ,, Other Countries ,, | 20,479 | 16,331 | 187,187 | 115,296 |
| Total ..... ,, | 89,039 | 33,473 | 830,738 | 239,509 |
| Bleaching Powder (Chloride of Lime) ..... cwt. | 80,227 | 37,903 | 19,560 | 11,929 |
| COAL TAR PRODUCTS— | | | | |
| Anthracene ..... cwt. | — | — | — | — |
| Benzol and Toluol galls. | 20,888 | 4,035 | 2,846 | 390 |
| Carbolic Acid .....cwt. | galls. | 5,061 | 28,860 | 11,200 |
| Cresylic Acid .....galls. | 19,726 | 101,334 | | 10,931 |
| Naphtha..... ,, | 2,458 | 3,267 | 325 | 334 |
| Naphthalene (excluding naphthalene oil) cwt. | 9,066 | 3,186 | 3,177 | 1,109 |
| Tar Oil, Creosote Oil, etc. .....galls. | 5,120,563 | 1,443,461 | 120,668 | 33,242 |
| Other Sorts ..... cwt. | 30,282 | 11,071 | 21,687 | 5,903 |
| Total ..... value | — | — | 177,563 | 63,109 |
| Copper, Sulphate of.. tons | 2,588 | 2,738 | 60,066 | 50,109 |
| Disinfectants, Insecticides, etc..... cwt. | 39,801 | 32,289 | 92,725 | 78,952 |
| Glycerine, Crude .... cwt. | 2,024 | 902 | 3,221 | 1,445 |
| Glycerine, Distilled .. ,, | 13,488 | 10,196 | 34,831 | 25,899 |
| Total ..... ,, | 15,512 | 11,098 | 38,052 | 27,344 |
| POTASSIUM COMPOUNDS— | | | | |
| Chromate and Bichromate ..... cwt. | 1,157 | 1,457 | 2,323 | 2,986 |
| Nitrate (Saltpetre) ,, | 1,261 | 671 | 2,354 | 1,278 |
| All other Sorts ... ,, | 1,828 | 1,425 | 11,534 | 8,240 |
| Total ..... ,, | 4,246 | 3,553 | 16,211 | 12,504 |
| SODIUM COMPOUNDS— | | | | |
| Carbonate, including Soda Crystals, Soda Ash and Bicarbonate cwt. | 443,853 | 335,143 | 114,639 | 89,628 |
| Caustic..... ,, | 147,788 | 150,165 | 94,194 | 96,323 |
| Chromate and Bichromate ..... cwt. | 3,088 | 2,718 | 5,006 | 4,314 |
| Sulphate, including Salt Cake ..... cwt. | 331,292 | 83,923 | 35,297 | 10,066 |
| All other Sorts ... ,, | 55,192 | 31,208 | 75,778 | 51,833 |
| Total ..... ,, | 981,213 | 603,157 | 324,914 | 252,164 |
| Zinc Oxide ..... tons | 207 | 239 | 7,112 | 6,439 |
| Chemical Manufactures, etc. (all other Sorts) .value | — | — | 324,127 | 217,842 |
| Total of Chemical Manufactures and Products .. value | — | — | 1,918,393 | 977,863 |
| DRUGS, MEDICINES, ETC.— | | | | |
| Quinine and Quinine Salts..... oz. | 166,014 | 82,839 | 16,607 | 9,475 |
| All other Sorts....value | — | — | 270,620 | 214,283 |
| Total..... ,, | — | — | 287,227 | 223,758 |
| DYES AND DYESTUFFS— | | | | |
| Products of Coal Tar cwt. | 9,289 | 8,932 | 64,962 | 79,252 |
| Other Sorts..... ,, | 9,759 | 14,638 | 9,462 | 13,935 |
| Total..... ,, | 19,048 | 23,570 | 74,424 | 93,187 |
| PAINTERS' COLOURS AND MATERIALS— | | | | |
| Barytes, Ground .. cwt. | 3,841 | 7,254 | 2,260 | 1,227 |
| White Lead (Dry) ,, | 4,131 | 1,852 | 8,222 | 3,243 |
| Paints and Colours in Paste Form .... cwt. | 36,403 | 29,122 | 71,761 | 54,738 |
| Paints and Enamels Prepared (including Ready Mixed) ..... cwt. | 39,691 | 33,210 | 130,531 | 102,635 |
| All other Sorts ... ,, | 46,082 | 32,127 | 85,100 | 62,773 |
| Total ..... ,, | 130,148 | 103,565 | 297,874 | 224,616 |
| Total of Chemicals, Drugs, Dyes and Colours.... value | — | — | 2,577,918 | 1,519,424 |

**Re-exports**

| | Quantities Month ended December 31, | | Value Month ended December 31, | |
|---|---|---|---|---|
| CHEMICAL MANUFACTURES AND PRODUCTS— | 1929. | 1930. | 1929. £ | 1930. £ |
| Acid, Tartaric .... cwt. | 36 | 42 | 314 | 262 |
| Borax..... ,, | 8 | 100 | 6 | 66 |
| Coal Tar Products value | — | — | 13,609 | 21,767 |
| Potassium Nitrate (Saltpetre)..... cwt. | 2,179 | 36 | 2,038 | 51 |
| Sodium Nitrate .. ,, | 692 | 1,858 | 346 | 849 |
| Tartar, Cream of.. ,, | 566 | 443 | 2,864 | 2,053 |
| All other Sorts ... value | — | — | 17,431 | 15,088 |
| DRUGS, MEDICINES, ETC.— | | | | |
| Quinine and Quinine Salts..... oz. | 19,920 | 8,568 | 2,234 | 878 |
| Bark, Cinchona (Bark, Peruvian, etc.) .. cwt. | 236 | 28 | 1,651 | 94 |
| All other Sorts....value | — | — | 29,256 | 26,354 |
| DYES AND DYESTUFFS— | | | | |
| Extracts for Dyeing— | | | | |
| Cutch..... cwt. | 520 | 423 | 824 | 698 |
| All other Sorts ... ,, | 243 | 126 | 1,872 | 387 |
| Indigo, Natural .. ,, | 26 | — | 665 | — |
| Extracts for Tanning ,, | 668 | 1,141 | 920 | 1,436 |
| PAINTERS' COLOURS AND MATERIALS ..... cwt. | 1,359 | 1,736 | 6,662 | 2,568 |
| Total of Chemicals, Drugs, Dyes and Colours.... value | — | — | 80,915 | 72,596 |

## Overseas China Clay Trade

### Imports during December

THE return of quantities and value of china clay, including china stone, imported into Great Britain and Northern Ireland, during the month of December is as follows :—

| COUNTRY WHENCE CONSIGNED. | QUANTITY. Tons. | VALUE. £ |
|---|---|---|
| Germany ..... | 3 | 32 |
| Switzerland (deduct to amend April Account) ..... | 1 | 10 |
| Czechoslovakia ..... | 10 | 80 |
| U.S. America ..... | 28 | 185 |
| Total..... | 40 | 287 |

### December Exports

EXPORTS of china clay, including Cornish or china stone, the produce of Great Britain and Northern Ireland, were :—

| DESTINATION. | Tons. | £ |
|---|---|---|
| Finland ..... | 2,053 | 2,291 |
| Sweden ..... | 2,335 | 4,802 |
| Norway ..... | 292 | 364 |
| Denmark (including Faröe Islands) ..... | 502 | 1,338 |
| Poland (including Dantzig) ..... | 10 | 35 |
| Germany ..... | 4,356 | 9,077 |
| Netherlands ..... | 2,235 | 4,948 |
| Belgium ..... | 2,880 | 5,019 |
| France ..... | 3,948 | 8,163 |
| Switzerland ..... | 100 | 150 |
| Spain ..... | 1,482 | 3,834 |
| Italy ..... | 2,086 | 3,359 |
| Czechoslovakia ..... | — | 3 |
| Greece ..... | 221 | 736 |
| Bulgaria..... | 6 | 69 |
| Siam ..... | 25 | 57 |
| China ..... | — | 1 |
| Japan ..... | 25 | 269 |
| United States of America ..... | 13,613 | 28,932 |
| Mexico ..... | 20 | 83 |
| Colombia ..... | 1 | 5 |
| Peru ..... | 5 | 24 |
| Chile ..... | 1 | 5 |
| Brazil ..... | 1 | 13 |
| Uruguay ..... | 1 | 10 |
| Argentine Republic ..... | 300 | 1,170 |
| Irish Free State ..... | 2 | 10 |
| Union of South Africa..... | 5 | 55 |
| British India ..... | 3,300 | 8,504 |
| Bengal, Assam, Bihar and Orissa ..... | 110 | 441 |
| Australia ..... | 23 | 254 |
| Total..... | 39,938 | 84,022 |

## What is Wrong with Our Export Trade

### Sir Arthur Balfour's Analysis

SUPPRESSION of the individual was largely responsible for our present trade troubles, said Sir Arthur Balfour, whose speech at the 39th Individualist Luncheon, held at the Hotel Victoria, Northumberland Avenue, London, on Wednesday, was an important step in the great national movement which is now being organised against the principal causes of industrial depression. Sir Arthur had taken for the title of his address "What is Wrong with our Export Trade?" In Russia, he said, collectivism had led to a situation in which there was tyranny at the top, machine guns in the middle, and distress, misery and enslavement at the bottom. If this country followed the methods of collectivism instead of giving free play to individual capacity and brains and making it worth while for the individual to show initiative, we would see the same thing here.

Outlining the cause of the present slump, Sir Arthur spoke of the immense destruction of wealth during the war, the extent to which population had fallen behind production, and the fact that Russia, China and India, involving 900 million people, had failed to improve their standard of living and had, in fact, gone back. Some great authorities attributed a large part of our difficulties to the mal-distribution of gold, and he felt that if the vast amount of gold in America and France could be distributed more evenly, that would go a long way to alleviate the situation.

### Influence of Reparations

But perhaps the most urgent thing needed was a reasonable settlement of allied debts and reparations. Some people had foreseen the influence of reparation payment in the disturbance of exchange and trade. During the first six months of last year German exports had totalled £310,000,000, ours had been £304,000,000, and for the first time we had taken second place to Germany. The effect of reparations had been to force down the standard of living in the paying countries, and this, in turn, had forced down our standard. We suffered more than other countries because we were still buying a very large percentage of our food and raw materials.

Rates, the most direct tax on the cost of production, had risen in a most astonishing manner, while national taxation was over £800,000,000. We could not go on finding this money. The gap between the twenty-four million voters and the 2,460,000 payers of taxation had to be bridged. We had reached saturation point in taxation, and a point where another 3d. on the income tax would increase unemployment by half a million. Pay for unemployment and legal methods of avoiding work were directing the minds of the people into channels where they had no right to be. It was also leading to the subsidising of industry because it enabled people to work three days a week and play on the other three. Large sums were being given in this way which, if asked for direct, would be refused point-blank.

### A Critical Situation

It must be made worth the while of those who had capacity and brains and accumulated capital to initiate employment, to push invention and enterprise, and to go abroad and take risks, and until that was done there must be unemployment. Having described the action of the Government in agreeing to the tariff truce at Geneva as a vast mistake, Sir Arthur Balfour quoted figures which showed that, while our exports last year were £12 15s. a head, taxation was £14 7s. 6d. a head.

Somehow or another we had got to reduce national expenditure. He doubted whether any party politicians would have the courage to do it, and he believed the situation of the country was so critical that we should be forced to have some kind of national agreement to face this question. Then the dole or unemployment system would have to be cleaned up very drastically.

If we could do without tariffs we should be much better off, but we had pushed up our standard of living so high that we could not now face open competition. He was astonished that the public was not better informed as to the economic position. If the politician had made that clearer we should not at the present time be facing strikes, lockouts and other obstacles to trade. We should let the people know where we stood. He had immense faith in their courage and they would face the position. It was no use talking rubbish about an improvement. Things were getting worse.

# Study of Water Pollution

## Report of Research Board

EXPERIMENTS in the laboratory and on a semi-commercial scale on the purification of waste waters from beet sugar factories, and progress in the investigations of the activated sludge process of sewage disposal and of the base exchange process of water softening, are recorded in the Report of the Water Pollution Research Board for the year ended June, which has recently been published with the Report of the Director of Water Pollution Research (H.M. Stationery Office, 9d.).

In his Report the Director (Mr. H. T. Calvert) states that arrangements have been made for an investigation of the causes of the corrosive and plumbo-solvent action of certain waters on mains and service pipes and on methods of treatment to prevent this action, to be conducted at the Chemical Research Laboratory at Teddington. Arrangements have also been made for a research, under the immediate direction of Professor F. G. Donnan, F.R.S., to be carried out at University College, London, on the colloids in sewage and beet sugar factories' effluents. These investigations have only recently been commenced so that the work in each case has not so far proceeded beyond the preliminary stages.

### The Tees Estuary

Work has continued on the survey of the River Tees, into the estuary of which a large number of effluents of different types are discharged, principally in the section of about seven miles from Stockton to Cargo Fleet. This portion of the estuary receives the untreated sewage from a population of about 275,000 and various trade effluents, chiefly from iron and steel works, coke oven installations and chemical works. In addition, many works use large volumes of estuary water for cooling and quenching purposes, often returning it at a high temperature.

The sewage and a number of trade effluents undergo oxidation in the estuary at the expense of the dissolved oxygen in the water. A large number of determinations, under different conditions, of the concentration of dissolved oxygen have been made, and the variations in oxygen concentration have been compared with changes in rainfall, fresh water flow and water temperature. The results have shown that in the Tees estuary the temperature of the water is an important factor, and as it rises the rate of de-oxygenation increases. At the same time it has been shown that low values for dissolved oxygen are generally accompanied by relatively high values for saline and albumenoid ammonia and nitrites.

Experiments are also in progress to determine the relative importance of the oxygen demands of various types of effluents and of the mud on the bed of the estuary, and of the oxygen removed by the use of water for cooling purposes. The oxygen demand of sewage, of trade wastes and of mud is being determined by experiments in the laboratory, and the quantities of dissolved oxygen in in-flowing and out-flowing cooling water are being measured directly. Estimates of the volumes of sewage effluents and trade wastes discharged into the estuary are being obtained through the kindness of local authorities and manufacturers, and much of this information has already been collected.

### Beet Sugar Effluents

Filtration experiments have been continued during the year at Colwick on the purification of effluents from beet sugar factories and laboratory experiments have also been continued at Rothamsted with the object of studying the process of purification, by biological filters, of solutions of sucrose, lactic acid and acetic acid separately, in admixture with one another, and in the presence of nitrogen added as albumen and as ammonium chloride. It has been concluded that the partial conversion of sucrose into acid products assists the process of biological filtration and that the oxidation of the acid products is definitely encouraged by the addition of nitrogen as albumen or as an ammonium salt.

### Zeolite Process of Water Softening

The investigation of the base-exchange process of water softening which was commenced at the Department's Chemical Research Laboratory at Teddington, on the recommendation of the Water Pollution Research Board, has been continued, and a number of typical commercial base-exchange materials have been examined in reference to certain of their properties. The exchange values of the two main types of base-exchange materials, the synthetic products which are prepared by the interaction of solutions of sodium aluminate and sodium silicate and certain minerals, have been determined with various rates of flow of water and different methods of regeneration with salt solutions of various concentrations. The bulk densities of the materials and the volumes of the interstitial spaces with definite grades of sizes have also been measured, and determinations have been made of their relative resistances to disintegration and their solubilities in water at different temperatures.

The experiments to determine the effect on the exchange values of different methods of regeneration have included the methods of single and double regeneration with solutions of common salt varying in concentration from 2·5 to 20 per cent. and in volume from 0·5 to 2·0 cu. ft. per cu. ft. of base-exchange material. Single regeneration consists of passing the salt solution only once through the layer of material but in double regeneration the material is first treated with the solution from a previous regeneration and then with a fresh solution which is afterwards used for the first stage of the next regeneration. In general, the exchange value increases with the quantity of salt used in the previous regeneration to a maximum value which is characteristic of the particular material and cannot be exceeded by the use of more salt.

Further experiments are in progress to determine the influence on the base-exchange process of variations in the temperature of the water and in the concentrations of dissolved calcium, magnesium, and sodium salts.

### Liquor Effluents from Gas Works

The Research Sub-Committee appointed by the Institution of Gas Engineers in June, 1926, to consider methods of overcoming the difficulties associated with the disposal of liquor effluents from gas works has now issued a fourth report. The principal objectionable constituents of the ammoniacal liquor produced in the carbonisation of coal are phenols, higher tar acids, thiocyanate and thiosulphate. When the crude liquor is distilled these constituents are afterwards found in the effluent spent liquors.

The oxygen absorption capacities of gas liquor effluents, as determined by N/80 potassium permanganate solution, are usually employed to indicate the relative polluting effects of these effluents if discharged into streams or sewers. According to this test, the phenols and higher tar acids present in ammoniacal liquors and gas liquor effluents generally account for more than 50 per cent. of the total oxygen absorbed values.

The various methods suggested for the removal of phenols are described in the Committee's fourth report, which includes a list of references to the literature of the subject. The methods, some of which have been operated on a large scale principally in America and in Germany, may be classified as follows:—(1) Recovery of phenols from ammoniacal liquor or effluent liquor by means of solvents such as benzole, trichlorethylene, dephenolised light tar oil, etc. (2) Recovery of phenols from ammoniacal liquor or effluent liquor by solid absorbents, *e.g.*, activated carbon. (3) Removal of phenols by volatilisation. (4) Extraction of phenols from crude coal gas at temperatures above the dew point of the gas before liquor condenses.

### Summary of Current Literature

The Department of Scientific and Industrial Research, which publishes the above Report, has also issued the first number for 1931 of its valuable monthly Summary of Current Literature on Water Pollution Research (H.M. Stationery Office, pp. 36, 1s. 3d.).

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## Experimental Paper Pulp Works

THE French Chemical Co. for the Treatment of Pine Wood is the subject of a note in the journal, *Le Papier*. This undertaking was formed to exploit various patents concerning the manufacture of paper pulp from wood particularly rich in resin and the recovery of the constituents of the resin, viz., spirit of turpentine and colophony. There is an experimental works at Croissy (Seine et Oise) to demonstrate the processes and examine the raw materials which can be utilised. Nearly all the colophony is extracted from the wood (90 to 95 per cent.) the latter being then treated as usual with soda or sulphate to obtain a very pure cellulose.

## Human Factors in Colour Judgments

### Recent Work on Colour Blindness

THE Manchester Sections of the Society of Chemical Industry, the Society of Dyers and Colourists, the Oil and Colour Chemists' Association, and the Chemical Section of the Manchester Literary and Philosophical Society, held a joint meeting on Friday, January 9. The chairman was Mr. G. A. Campbell, M.Sc.

Mr. O. D. C. Pierce, M.Sc., of the Manchester University Psychological Department, gave a lecture entitled "Human Factors in Colour Judgments." All colour classification and identification, he stated, depended upon working out the relationship between the psychophysical attributes (*i.e.*, brilliance, hue and saturation) and the physical attributes of wave-length, intensity and purity. It should be noted that the physical association between wave-length, intensity and purity was very close; for example, a change in purity involved change in wave-length composition. In regard to colour blindness, there were very many tests at present employed. They all fell under one or other of the following headings; (*a*) Coloured cards or fabrics—*e.g.*, Stillings cards or Holmgren wools; (*b*) coloured light from filters—*e.g.*, Edridge Green lanterns; (*c*) spectrometer tests. In many cases experimenters thought it necessary to use both a card and a lantern test.

#### Colour Blindness

The chief classification of colour blindness had been into three main types—trichromats, dichromats and monochromats. Monochromats were those persons who apparently saw all parts of the spectrum of one hue, the parts differing only in luminosity. A dichromat could match all parts of his colour spectrum with mixtures made up of only two variables. Trichromats required three variables, and might be subdivided into those with normal colour vision and the anomalous trichromats who, while using three variables to match their colour spectrum, yet differed from the normal colour vision observers in the proportions of red and green required by them to match a spectral yellow. This last class had been very fully investigated by Lord Rayleigh, and the Red/Green and Yellow colour match was often referred to as the Rayleigh equation.

The recent work on colour blindness carried out by Hess, Oloff and others had thrown a new light on the problem. While there was still much dispute in nearly all aspects of the problem, there was evidence of an evolutionary scale in colour defects. It seemed probable that the emphasis formerly placed on colour blindness as a defect had obscured the possibility of the so-called colour defective having super-normal sensitivity. Hess thought that many anomalous trichromats had been wrongly classed as colour weak because they did not accept the normal Rayleigh equation, when all that it proved was colour inequality, which might result from super-normal sensitivity to one colour.

#### Sensitiveness to Certain Colours

Cases were also found in which normal sensitiveness to one colour was associated with either normal or subnormal sensitiveness to another. Hess would call such cases "red-sighted" and "green-sighted," etc. The "red-sighted" required less red in the Rayleigh colour equation than the normal subjects. Their sensitiveness to blue and yellow was about normal. Hess emphasised the fact that wide variations occurred not only in the red and the green, but also in the blue and the yellow, and cited numerous cases which showed that the sensitivity to one colour could vary independently of the rest.

An interesting commentary on this work was found in the results of Allen, who had carried out a very important series of experiments, using the critical frequency of the disappearance of flicker as a test of retinal fatigue. The relationship suggested by Allen between normal colour vision, colour blindness and anomalous colour vision could be formulated by stating that in the visual mechanism of the normal eye there was a balance between the direct effect of stimulation and the reflex action of enhancement and inhibition by which sensitivity was controlled. In colour blindness the direct effects of stimulation were considerably reduced in intensity because the reflex process of inhibition was for some reason much more prominently developed than enhancement. In anomalous trichromatism the opposite condition prevailed. The enhancing actions were far more highly developed than the inhibitory. It was quite possible, consequently, that as many types of anomalous vision might be discovered as there were forms of colour blindness. This conclusion might be summarised by stating that in anomalous trichromatism there was greater sensitivity than in normal colour vision to certain wave-lengths in the spectrum.

Very wide individual variations existed for all the three fundamental attributes of colour. These variations appeared to act with some degree of independence of each other; for example, normal colour vision was no guarantee of normal brightness discrimination, and that a colour-blind person might have a visibility nearer normality than a colour normal. The results obtained by spectral lights might not necessarily hold good for results on pigments. Colour abnormality might be due to super-normal sensitivity as well as to sub-normal sensitivity. This led to the consideration as to whether it would be necessary to abandon all classification by types, arrange colour defectives or super-normals in distribution tables and give a colour graph or profile for each subject showing his efficiency or deficiency for each colour in terms of a percentage of normal or average attainment. Colour selection tests based on this method seemed to be quite possible, and could be used in selection of colour matchers.

A discussion followed the lecture.

## Combined Steam Power and Heating

### Notable Installation in Great Britain

THERE is now more or less general recognition that in all industrial establishments requiring a considerable amount of low pressure heating and "boiling" steam, the most efficient method is to supply the steam, at any desired pressure, as exhaust direct from a back-pressure or pass-out engine or turbine.

The chemical industries represent one of the most important fields in this connection, and the economy obtained is an important factor as compared with the ordinary method of a compound condensing main engine drive, and steam for process work taken direct from the boilers, either separate low-pressure units, or through a reducing valve. Approximately the amount of the saving is 25 to 50 per cent. of the coal bill, dependent on the proportion of process steam required, which in the average chemical works may be, say, 40 to 65 per cent. of the total steam production, depending on the nature of the operations.

A very similar industry from the point of view of steam demand, is the textile, and typical of what may be accomplished in this connection is a "Belliss" 750 k.w. impulse pass-out turbine and generator running at 4,500 revolutions per minute, recently installed at the well-known carpet factories of Brintons, Ltd., Kidderminster. This is operated with superheated steam at about 140 lb. pressure and 400° F. at the turbine stop valve, and to suit the particular conditions two separate pass-outs are operating. One of these supplies 17,000 lb. of steam per hour at 30 lb. per square inch pressure for the dye house, the other 10,000 lb. pressure per hour at 3 lb. pressure for heating the mill, while if necessary any additional amount of steam is available for the dye house direct from the boilers through reducing valves, the rest of the steam going to the condenser at 28½ in. vacuum. Also, four steam meters are installed, giving a continuous record in each case of the high pressure steam going to the turbine, the pass-out to the dye-house, the pass-out to the heating system, and any additional live steam to the dye-house direct. Further, on the most economical lines, the exhaust from the boiler feed pump and stand-by main engine are connected to the 3-lb. pressure heating main.

### "The Chemical Worker"

THE bulletin formerly issued by the Drug and Chemical National Union has been discontinued and replaced by *The Chemical Worker*, which is described as "a fine informative journal." In the leading article, "1930–1931," it is stated: "All we need is to increase our 'shock troops,' changing thousands of our passive, dues-paying members into thoroughly class-conscious trade unionists."

## Chemical Products from Natural Gas

### Extensive American Research

THE possible utilisation of natural gas, now being wasted in many fields in enormous quantities, for the production of numerous valuable chemical products is being studied by the United States Bureau of Mines, Department of Commerce. Since in most fields gas under pressure is the main source of the energy causing the oil to move through the sands into the wells and thence to the surface, this coincident production of natural gas will continue as long as present-day producing methods are used. Generally the use of this gas is restricted, and markets are not readily available. Consequently, a large portion of the gas produced at such times is often wasted by being blown into the air.

In some of the important California fields the surplus natural gas production has run into enormous figures. In the Turner Valley field of Canada 250,000,000 cubic feet of gas is being burned daily in flambeaus, as there is no present outlet for the gas except at prohibitive cost. Similar losses of gas occur in oil fields all over the world, and within the last few years much thought and engineering effort have been directed toward finding means of utilising this gas profitably.

### Three Types of Reactions

One possible method of utilisation is in the manufacture of chemical products, and much work has been done on the various types of reactions that might be of commercial value. The reactions offering means of approach to the problem may be divided roughly into three general classes: (1) Controlled oxidation, either with steam, or by oxygen, or by gases containing oxygen; (2) pyrolysis, the breaking up of the hydrocarbon molecules with heat and the uniting of these parts to form new substances, or, in the extreme, the decomposition to carbon and hydrogen; (3) chlorination, the replacement by chlorine of more or less hydrogen in the hydrocarbon molecules.

At present very few products can be obtained on a commercial basis by synthesis from natural gas, and in fact some products have been found only in relatively small amounts in laboratory experiments. In the present-day development of chemistry, however, that which is curious to-day becomes commonplace to-morrow, so that in studying the possibilities of these various reactions the chemist makes no apology for considering the apparently insignificant products that are of minor commercial importance at present.

### Hydrogenation of Oils

At the present time there is much interest in the hydrogenation of oils. An important method of obtaining the necessary hydrogen is by the interaction of natural gas and steam at temperatures of about 500 degrees centigrade or lower in the presence of catalysts such as iron oxide. The products are chiefly hydrogen and carbon dioxide. The latter is removed by suitable scrubbing, and fairly pure hydrogen is thus obtained. Its major uses are as a reducing agent in the process industries; the hydrogenation of mineral and vegetable oils and coal; and the synthetic production of ammonia, which is widely used as a refrigerant, and in the manufacture of fertiliser.

Methane also reacts with steam at 900° C. in the presence of suitable catalysts to give a mixture containing one volume of carbon monoxide and three volumes of hydrogen. This mixture of carbon monoxide and hydrogen (water-gas) is the basis for several catalytic syntheses. At high pressures and at temperatures of 200 to 400° C. in the presence of suitable catalysts water gas yields methanol. Methane, with the proper catalysts and under suitable conditions of temperature and pressure may be oxidised directly by oxygen, or oxygne-containing gases to formaldehyde and other oxygenated products.

By pyrolysis methods hydrogen may also be obtained. Other gases formed in the pyrolysis of natural gas are acetylene, butadiene, ethylene, propylene and butylene. The liquids formed are benzene, toluene and xylene and the solids are chiefly naphthalene and anthracene. Chlorination is generally applied to methane, although the other gases may also be chlorinated.

Even if the technical difficulties attendant upon the commercial production of the various products mentioned are solved, the economic side of the problem should receive serious consideration. Since, however, the raw material under consideration is virtually a waste product, any return, however small, would be profitable and an aid to conservation of natural resources. Further details are given in Information Circular 6388, of the United States Bureau of Mines, Department of Commerce, Washington, D.C.

## The Sterilisation of Sewage

### Application of Liquid Chlorine

THE treatment of sewage and sewage effluents to remove all offensive properties is one of the most valuable fields for the continuous addition of a measured trace of liquid chlorine. Some of the other applications are the sterilisation of towns water supply, the prevention of organic growths on engine and turbine condensers, as well as in cooling towers and circulating pipes, and the treatment of swimming bath water.

A striking example of the value of chlorine gas, and the use in this connection of the "Chloronome" apparatus of the Paterson Engineering Co., Ltd., in the treatment of sewage is the Dadar-Matunga Estates of the Bombay Improvement Trust in the north-east of the Island of Bombay. The general conditions and the results obtained were described in detail by T. R. S. Kynnersley in a paper read at the last Engineering Congress in Bombay.

The area covered is 200 acres, with a population of 19,000 to 20,000, and in the process of purification of the sewage by the aeration process a particularly offensive odour was caused. After preliminary experiments with bleaching powder, a "Chloronome" was installed capable of giving up to 12 lb. of chlorine per hour. The installation has proved a complete success. The exact amount of chlorine required is adjusted quite easily by means of a single valve. The cost of this chlorine gas treatment, given in detail in the paper, is approximately the same as that for the maintenance of filter beds and septic tanks hitherto used; the total volume of sewage involved varies from 1,500,000–3,500,000 gallons per day.

Sterilisation of sewage by chlorine gas is also found, as a result of extensive experience, to eliminate the nuisance of flies and the formation of slimy growths and "pools" on the surface of the filter beds, which indicate irregular penetration and utilisation of the total area. As indicated, the amount of chlorine required varies according to circumstances but is generally within the range of 0·50–2·00 parts of chlorine per 1,000,000 and the purification is so complete that the clear and sterile effluent can be used as a water supply for general industrial operations.

### The Perfect Income

"THE perfect income is that which, as it goes into the pocket, brings into the heart and mind a sense of satisfaction and justice. The man who, when he gets his money, whatever it is, can feel that he has given value in return, enjoys a perfect satisfaction which is denied to all the rest. Whatever the system under which we live may be called, the fact remains that we have to render service to one another, and to exchange those services each with the others. We should all put something into the commonwealth and all take something out of it. If when we count up our incomes, be they large or small, we have a feeling that they are something less than the contribution which we have made to the common well-being, we can claim that our incomes reach as near to perfection as is possible in a work-a-day world."—Sir Ernest Benn, in "Accuont Rendered (1900–1930.")

### Utilising Difference in Air Pressures

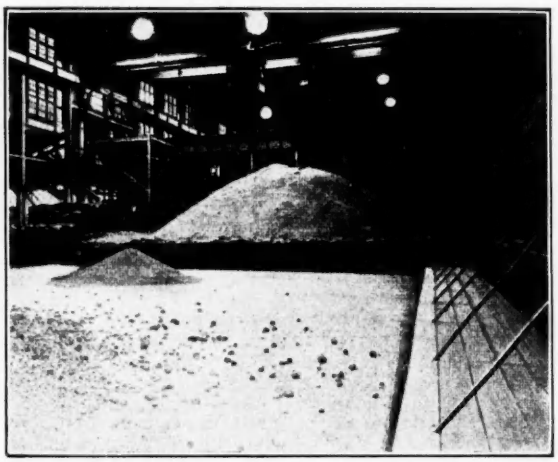
UTILISATION of the difference in pressure between waters of different salt content for power production, following the principle demonstrated by M. Georges Claude, when he successfully used the difference in temperature between surface and deep-sea water to furnish electrical energy, has been suggested in a report to the French Academy of Sciences, according to the Paris correspondent of the American Chemical Society. "At the mouth of rivers," the correspondent explains, "a large volume of fresh water is found immediately in contact with a large volume of salt water, and it seems possible, by means of a suitable apparatus built on principles similar to those demonstrated by Claude, to utilise the difference in vapour pressures."

# Canadian Superphosphate Plant

## Capacity for Mixing 60 Tons Per Hour

CANADIAN INDUSTRIES is now operationg a complete new fertiliser plant at Beloeil, Quebec, for the production of superphosphate. Before erecting the works, various types of plant construction and methods of manufacture were studied. The investigations, coupled with the fact that the construction could be commenced from the ground up, have resulted in a most modern and up-to-date plant.

Beloeil is well situated, since nitrogen and rock can be delivered by water to the plant, and sulphuric acid is already available. The portion of the plant used for storage, mixing and shipping mixed fertilisers is spacious and completely equipped to offer for domestic or export business various brands of mixed and complete fertilisers. Machinery installed



INTERIOR OF DRY MIXING BUILDING, FERTILISER PLANT, BELOEIL, QUEBEC.

is of the latest type to insure accurate weighing and mixing. Capacity has been well considered in order to enable the plant to make prompt shipments. The building is of steel construction with corrugated metal sheeting. A copious use of aluminium paint has been made. This painting, combined with spacious window capacity, insures a lighter interior, thus assisting in the care and preparation of mixtures.

### A New Method

The particular feature that is new to Canada (according to *Canadian Chemistry and Metallurgy*) is the method employed for manufacturing superphosphate. In the States and in other countries, superphosphate is still manufactured according to the process known as "The Den Method." This method has been employed continuously for over eighty years without any major improvements other than installation of mechanical handling devices. The chemistry and chemical control have remained constant. Before installing the Den System, therefore, Canadian Industries sought improvement in the manufacture of superphosphate and purchased the rights to manufacture this important material from the Oberphos Company, by means of a new process recently developed by the latter company.

The outstanding feature of the process is based on the fact that raw materials can be converted into saleable superphosphate in a single step. The process and apparatus represent an entirely new design and for the first time enable the manufacturer to produce superphosphate in a single piece of machinery. The saving in such rapid and uniform processing is obvious when compared with other methods. This advanced method now established in Canada by Canadian Industries and directly under the supervision of Mr. L. V. Tatley, Superintendent of the plant, is one of the principal progressive steps in fertiliser manufacture made in recent years. The whole plant is new and is centrally located in the general works of Canadian Industries at Beloeil.

### Accurate Mixing and Distribution

The main advances are found in the rapidity and the economics of manufacture and the physical characteristics of the superphosphate. The resultant product is granular and dried to any desired degree of moisture, is permanently free flowing and non-caking and lends itself to easy handling and accurate mixing with other materials. The fact that this superphosphate can be accurately mixed with other raw materials has been recognised by Canadian Industries as an essential feature for proper plant nutrition. Accurate mixing and distribution in the soil are two of the most important elements for uniform plant growth and nutrition.

In addition to the special apparatus for producing superphosphate, according to the Oberphos method, it has been necessary at Beloeil to erect storage and handling equipment for the two raw materials required, namely, sulphuric acid and phosphate rock. Sulphuric acid is handled in the usual tanks. Phosphate rock is conveyed from the River Richelieu by a local haulage system to a rock storage building at the rate of sixty tons per hour. The capacity of this rock storage building is eight thousand tons and the building is equipped with the most economical equipment for handling the rock storage consisting of one drag bucket and two scraper conveyors.

The rock passes over two scales to rock storage and by scraper and elevator to an air separator. The fines go as dust to a fifty ton storage tank and the coarse material to a grinder and back through the separator system, finally reaching the rock dust storage tank. Both the grinding system for phosphate rock and the system for handling sulphuric acid have been designed to produce accurately proportioned and controlled raw materials necessary for accuracy in any final product.

### The Hamilton Plant

A new mixing plant, with a capacity of sixty tons per hour, has been operating for some months at Hamilton, Ont. The plant has the latest conveying, mixing and bagging machinery and is capable of high production. The problem of supplying such a large number of brands and mixed carlots tend to reduce total production and is difficult to overcome. The Hamilton plant is so constructed that an acidulating unit can be added, and this development may be anticipated in due course.

## Native Oils and Medicinal Drugs in India

INVESTIGATIONS to advance the use of native oils and regulate trade in medicinal drugs are being undertaken in India, according to the Madras correspondent of the American Chemical Society, who asserts that "the economic salvation of this backward country very largely depends on the application of science to industry on a nation-wide scale." The fixed oils from crocodile fat, vaina seeds, cantharides beetles, and other native fats, have been examined with a view to industrial utilisation by the department of chemistry of the Indian Institute of Science, Bangalore. A committee has been appointed by the Government of India to "inquire into the extent to which drugs and chemicals of impure quality or defective strength are imported, manufactured, or sold in British India." Analyses showing such products as citrate of soda, often added to the milk given to young babies, consisting of soda ash or dried washing soda, illustrate the need for such investigation.

## Irish Free State Fertiliser Imports

FERTILISERS rank first in importance among the chemical imports of the agricultural Irish Free State. Imports during 1929 registered increases for each classification as compared with the previous year, as is shown in the following table :—

| Description | 1928 Long tons | 1929 Long tons |
|---|---|---|
| Guano | 2,771 | 2,965 |
| Phosphate rock | 60,630 | 93,335 |
| Basic phosphate slag | 30,243 | 34,928 |
| Kainite | 12,896 | 13,359 |
| Sodium nitrate | 2,202 | 3,700 |
| Ammonium sulphate | 15,443 | 20,712 |
| Superphosphates | 38,884 | 44,462 |
| Compound manures and other fertilisers | 14,165 | 24,767 |

# Trade Prospects in South America

### Our Special Commissioner's Tour

A CONSIDERABLE response has followed the offer made by THE CHEMICAL AGE, in connection with Mr. John Benn's forthcoming tour in South America, to obtain information on trade conditions and agencies in that important market. Inquiries have been solicited by well-known firms in London, Birmingham, Sheffield, and Reading, who are anxious to extend their business in view of the personal lead given by the Prince of Wales. More than 800 firms are exhibiting at Buenos Aires, and various chemical manufacturers will be represented, the largest stand in this industry being taken by Imperial Chemical Industries, Ltd.

On Thursday the Prince sailed for South America on the *Orpesa*, and he will travel through the Panama Canal to Peru and Chile, before opening the Buenos Aires Exhibition. It is understood that he may fly during this preliminary tour down the coast of Chile, and the Prince's own aeroplane is being taken to Argentina on board the *Eagle*. The British Government is arranging the biggest display of British aircraft ever shown abroad, and demonstration flights will be given daily during the Exhibition. Aeroplane manufacturers are making a definite bid for this market, and it will be the best possible publicity for British aviation if the Prince finds himself able to fly his own aeroplane.

### Trade Information for Inquirers

Our special representative will follow the Royal route through Panama and Chile, first going to New York to renew business acquaintances which were established during a visit to the United States in 1922. From there Mr. Benn will sail on the *Santa Clara*, which is due to reach Valparaiso on March 2. During a week's stay in Chile he will interview Captain Murray Harvey, the British Commercial Secretary at Santiago, and will also visit Don Agustin Edwards, the principal newspaper proprietor in Chile.

On arrival in Buenos Aires, our representative will attend the opening of the Exhibition on March 14, and will take part in the official receptions organised in honour of the Prince of Wales. It is expected that business engagements will occupy about three weeks, and a visit to the Bovril Estates at Santa Fe will conclude Mr. Benn's tour in Argentina. He will probably visit Brazil for some days, joining the *Arlanza* at Rio de Janeiro for the homeward voyage on April 12. THE CHEMICAL AGE will be pleased to provide information on trade prospects in South America, provided that inquiries are received during the next few days. Mr. Benn leaves England on February 1, and is now completing arrangements for the tour.

# Third List of Exhibitors

### Total Now Nearly 800

THE third list of exhibitors at the forthcoming Exhibition in Buenos Aires has just been issued. It contains the names of 428 firms and brings the total to date up to 784. Included in the list are :

The Aerogen Co., Ltd., Alloy Welding Processes, Ltd., Amalgamated Carburetters, Ltd., Anti-Attrition Metal Co., Associated British Machine Tool Makers, Ltd., Associated British Maltsters, Ltd., Barford and Perkins, Ltd., Bell Brothers (Manchester, 1927), Ltd., Lewis Berger and Co., Ltd., A. Boake, Roberts and Co., Ltd., British Electrical and Allied Manufacturers' Association (Incorporated), British Insulated Cables, Ltd., British Oxygen Co., Ltd., British Paints, Ltd., Broom and Wade, Ltd., Brothers Chemical Co. (1922), Ltd., John Brown and Co., Ltd., Crompton, Parkinson, Ltd., English Steel Corporation, Ltd., Essex Fire Extinguisher Co., Ltd., Fuller's Earth Union, Ltd., Goodlass, Wall and Co., Ltd., London Aluminium Co., Ltd., Marley Hill Chemical Co., Ltd., Metropolitan Fuel Co., Ltd., Minimax, Ltd., National Union of Manufacturers, Patent Enamel Co., Ltd., Reavell and Co., Ltd., Rotary Air Compressor Co., Ltd., Rushton Tractor Co., Ltd., Ruston and Hornsby, Ltd., Standardised Disinfectants Co., Ltd., Stream-Line Filter Co., Ltd., United Water Softeners, Ltd., Visco Engineering Co., Ltd. and Wild Barfield Electric Furnaces, Ltd.

# Imperial Chemical Industries and Research

### Professor Donnan's Tribute

A TRIBUTE to the work which Imperial Chemical Industries, Ltd., are doing in supporting research in this country is paid by Professor F. G. Donnan, in a letter to *The Times* on Wednesday. He emphasises the help which the company has given to the research work of the physical and chemical laboratories of the universities. Besides granting money for the general and quite unfettered development of research, the important work of Professor Bone at the Imperial College of Science has been liberally helped and the company has organised a small but very active group of investigators at the Chemical Department of University College, London.

"There is no doubt," he adds, "that the necessity for continuous scientific research was amply realised by that great man, the late Lord Melchett, and his far-seeing colleagues on the board. I see no reason to doubt that Lord Melchett's successor, Sir Harry McGowan, will do everything in his power to carry on the magnificent work which, initiated by Messrs. Brunner Mond and Co., has been so splendidly continued by Imperial Chemical Industries. I am sure there are few civilised countries in the world which can show a better example of high appreciation of research work."

# Conditions in the Pulp Industry

### Production Limited to Meet Depression

THE present unfavourable position of the pulp market, characterised by small sales and weak prices, is the subject of a note in the latest issue of the *Swedish Economic Review*. There is an obvious over-production of sulphate pulp, it is stated, and in spite of more favourable conditions, sulphite pulp has also felt the depression severely. To accommodate production to the weakened demand, conferences between the more important sulphite manufacturers have decided on a reduction of about 15 per cent. This decision was taken by representatives of producers in Sweden, Norway, Finland, Germany and Czechoslovakia, and was ratified in Stockholm in the middle of November. The sales of mechanical pulp have been very small.

During the third quarter of 1930 shipments were less than during the corresponding period of 1929. The total export amounted to 445,300 tons (dry weight) as against 494,200 tons in 1929. The decrease was particularly marked in the case of mechanical pulp. For the first nine months of the year the exports amounted to (in thousands of tons dry weight) :—

| | Jan.-Sept. 1928. | Jan.-Sept. 1929 | Jan.-Sept. 1930. |
|---|---|---|---|
| Sulphite pulp ..... | 422·1 | 643·3 | 585·2 |
| Sulphate pulp ..... | 199·5 | 334·1 | 263·2 |
| Mechanical pulp ..... | 167·2 | 211·1 | 192·7 |
| Total .... | 788·8 | 1,188·5 | 1,041·1 |

The decline has affected all the more important markets for Swedish pulp, though least in the case of France, which shows only an inconsiderable decline.

### Plans for Large Rayon Amalgamation

IT is authoritatively understood, states Fairchild's New York correspondent, that a number of prominent European rayon executives will shortly sail for the United States in connection with plans for a large scale amalgamation of rayon producing concerns, many of which have important English connections. Present proposals, it is said, provide for the formation of two groups. On the one hand, there is the Viscose Co., while on the other there are the Du Pont Rayon Co., Inc., American Bemberg Corporation, American Glazstoff Corporation, American Enka Corporation, Industrial Rayon Corporation, and Turbize-Chatillon Corporation, which will be amalgamated if the proposals, which it is understood will be submitted to the delegates, are endorsed. Marketing and price agreements will then be negotiated with a view to eliminating wasteful competition.

The merger, it is said, will be carried through on a spindleage basis, and not according to capital strength.

# From Week to Week

MR. SAMUEL COURTAULD, chairman of Courtaulds, Ltd., has been appointed a trustee of the National Gallery on the expiration of the term of office of Sir Robert Witt.

THE ADDRESS of the London office of Penney and Porter (Engineers), Ltd., has, since January 7, been 66, Victoria Street, Westminster. Telephone No. Victoria 0869. Mr. E. W. Broadbent is in charge of the office.

A NEW CATALOGUE, including several important additions to the B.D.H. list of fine chemical products, including organic and inorganic chemicals, analytical reagents, indicators, standard stains, etc., has just been issued by the British Drug Houses, Ltd., Graham Street, London.

A CONFERENCE was held in Glasgow on Monday, between representatives of the Scottish Employers' Federation of Dyers and Bleachers and of the Amalgamated Society of Dyers and Kindred Workers, to consider proposals for a new wage agreement in place of that which expired on October 31 last.

THE ANNUAL DINNER of the Finsbury Technical College Old Students' Association will take place on Saturday, February 21, at Trocadero Restaurant, London, and any old students not on the register are asked to apply for tickets to Mr. F. R. Rouse (London Sec.), 15, Clifton Gardens, Golders Green.

THE ANNUAL MEETING of the Liverpool Section of the Society of Chemical Industry will be held on Friday, February 20, and the following retiring officers have been nominated for re-election: Chairman, Dr. W. Trantom; Vice-Chairman, Professor C. O. Bannister; Hon. Treasurer, Mr. A. E. Findley; Hon. Secretary, Mr. E. Gabriel Jones. Representative on Chemical Engineering Group, Mr. W. Ramsay Sibbald.

MANCHESTER CHAMBER OF COMMERCE have sent invitations to the Chambers of Commerce of Liverpool, Blackburn, Bolton, Burnley, Bury, Oldham, Preston, Runcorn, Warrington, Widnes and Stockport, to send two representatives each to a private conference to be held in Manchester on January 20 to discuss a proposal for establishing new industries in South-East Lancashire, to fill the gap in employment created by the contraction of the cotton trade.

THE GOVERNMENT OF INDIA have appointed a small committee under the chairmanship of Lieut.-Col. R. N. Chopra, I.M.S., to inquire into the extent to which drugs and chemicals of impure quality and defective strength, particularly those recognised by the British Pharmacopœia, are imported, manufactured or sold in British India, and to make recommendations for control. It is expected that the committee's investigations will be completed towards the end of February.

THE HOME SECRETARY has given notice that he proposes to set up a medical board to give certificates in cases where compensation is claimed for silicosis or asbestosis, and to carry out periodic medical examinations of workers employed in certain processes involving exposure to silica or asbestos dust. He also proposes to extend the right to compensation to workmen who, though not totally disabled, are found to be suffering from silicosis to such a degree as to make it dangerous for them to continue in their employment, and to provide for compensation by employers of workmen in certain processes involving exposure to asbestos dust.

LIEUT.-COMMANDER KENWORTHY, in the House of Commons, recently inquired whether, in view of the results obtained from the experiments in the Royal Navy in the use of oil fuel produced from British coal, the purchase, at the present low market price, of suitable coal mines had been considered, as well as the erection of Government extracting and refining plant for obtaining oil fuel for the Fleet from British coal. The First Lord of the Admiralty (Mr. Alexander) replied that no such steps were contemplated. However, because of the possible danger of depending on overseas supplies of fuel oil and the general desire to help the coal industry, they had been pressing at the Admiralty along the lines of giving actual trials with samples of oil. But on the present economic basis it would be quite impossible for the Admiralty to purchase such oil to a large extent for Fleet requirements. They had to rely upon getting much better economic conditions of production than they had at present, but they were pressing forward.

RECENT WILLS include Mr. Edward Mount, of Aughton, near Ormskirk, for many years secretary of the United Alkali Co. (net personalty £10,117), £11,385.

DUNDEE HARBOUR TRUSTEES have approved plans for the lay out of a proposed tankage and refinery for the production of bitumen at Dundee Harbour by William Briggs and Sons, Ltd.

THE BEMBERG RAYON WORKS, states a Berlin message, have been closed down owing to a wage dispute, but stocks are sufficient to ensure the continuance of deliveries for a lengthy period.

A BOOKLET of "Hints for Commercial Visitors to Persia" has just been prepared by the Commercial Secretary to H.M. Legation at Tehran and has just been issued by the Department of Overseas Trade.

NORTHWICH RURAL COUNCIL recently purchased, from Imperial Chemical Industries, Ltd., the mansion at Hartford vacated by Sir John Jarmay, for council offices and have decided to name them "Whitehall."

RECENT MESSAGES on the subject of the Chilean nitrate merger negotiations in New York, state that they are proceeding very satisfactorily, and conversations are being carried on with representatives of the Chilean Government on a number of delicate points which are still unsettled.

THE MIDLAND CHEMISTS' dinner dance is to be held on Saturday, February 7, at the Midland Hotel, Birmingham. The chair will be taken by Mr. W. A. S. Calder, and distinguished guests will include Dr. G. C. Clayton, President of the Institute of Chemistry, and Mr. C. S. Garland.

OVER 200 MEN employed at the zinc works of the Sulphide Corporation, Ltd., at Seaton Brook, near West Hartlepool, have been given notice, and the works are to be practically closed. The position is stated to have been brought about through the large quantities of spelter dumped in this country, with the consequent drop in price to a record low level.

THE REPORT of I.G. Farbenindustrie shows that during the fourth quarter of 1930 sales of dyestuffs for textiles were lower, but sales for paper and other specialities were higher. While sales of chemicals and ammonium sulphate declined those of special nitrogen products remained about the same. Photographic and medical products sales were good, but less was received on account of artsilk industry products. It is added that the whole situation of the company is quite satisfactory.

A REVIEW OF WHOLESALE PRICES in 1930 is included in the current issue of the *Board of Trade Journal*. Among the chemicals mentioned sulphuric acid (pyrites 168°) and ammonium sulphate became cheaper during the year. Linseed oil was quoted at £47 10s. per ton in January, and the price fell consistently during the year to £24 per ton in December. Chemical wood pulpy sulphite bleached, and mechanical wood pulp, pure 50 per cent. moist, declined in price by £2 10s. and 7s. 6d. per ton respectively.

A CIRCULAR just issued by British Bitumen Emulsions, Ltd., says that as the offer last October did not meet with the requisite response, the directors have offered the whole of the balance of unissued capital to the International Bitumen Emulsions Corporation, the licensor company. The corporation has cabled its willingness to provide whatever further capital is necessary for the expansion of the business, provided it can obtain a controlling interest. An extraordinary general meeting of the company is being called on January 19.

THE MARKET FOR HEAVY CHEMICALS IN FINLAND is the subject of a confidential report prepared by the Department of Overseas Trade from information furnished by H.M. Consul at Helsingfors. Firms desirous of receiving a copy should communicate with the Department at 35, Old Queen Street, London, quoting reference number B.X.6939. A similar report on the market for disinfectants, insecticides and animal dressings in Portugal, based on information provided by the Commercial Secretary at Lisbon, can be obtained by quoting reference B.X.6935.

## Obituary

MR. ALEXANDER MCPHERSON (78), late works manager of Duncan Flockhart and Co., manufacturing chemists, Edinburgh, and 42 years in the service of the firm.

# Patent Literature

*The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.*

## Abstracts of Accepted Specifications

338,003. Preparing Barium Carbide, and Application to Continuous Manufacture of Acetylene and Barium Hydrate. International Industrial and Chemical Co., Ltd., 120, St. James Street, Montreal, Canada. International Convention date, November 21, 1928.

In the manufacture of barium carbide, the mixture of barium carbonate, or oxide and carbon is mixed with an inert support, preferably bibarytic silicate. The mixture is heated, preferably in a current of hydrogen, with or without carbon monoxide or methane to above 1600° C. without melting or losing porosity. The product can be used to produce acetylene, and barium hydrate, and the latter may be again converted into barium carbide. The bibarytic silicate may be formed in the course of the reaction by adding silica or a silicate.

338,007. Fertilisers. Soc. Chimique de la Grande-Paroisse, Azote et Produits Chimique, 40, Rue du Colisée, Paris. International Convention date, Jan. 11, 1929. Addition to 331,451.

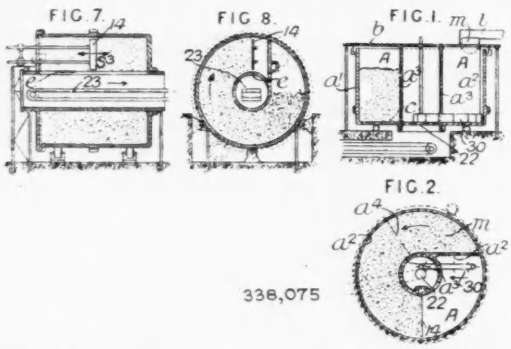
Sodium nitrate is treated with potassium chloride, and the products of double decomposition are treated with ammonia, carbon dioxide and water. The double decomposition is effected in the mother liquor obtained after precipitation and separation of the sodium bicarbonate.

338,023. Cyanamides. N. Caro, 97, Hohenzollerndamm, Grunewald, Berlin, and A. R. Frank, 138, Kurfürstendamm, Halensee, Berlin. International Convention date, December 6, 1928. Addition to 279,811.

Calcium and magnesium carbonates are treated with ammonia to obtain the cyanamides, and the water produced in the reaction is removed by solid substances such as carbon, carbonaceous materials, or phosphorus pentoxide which are mixed or briquetted with the materials. When phosphorus pentoxide is used, a fertiliser is obtained containing cyanamide and phosphoric acid.

338,075. Superphosphate Chambers. D. Wellisch, 64A, Palmoticeva Ulica, Zagreb, Yugo-Slavia. Application date, January 31, 1930.

In the superphosphate chamber a cylindrical reaction chamber A is rotatable on a vertical axis around a hollow



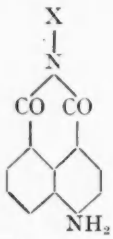

cylinder $a^3$ having a cover $b$ carrying a mixer $m$, and exhaust flue $l$. The cylinder $a^3$ carries a tangential wall $a^2$. In normal working the charge is added continuously and is discharged by a number of reciprocating knives 14, so that it falls to the bottom $c$ and is removed by a conveyor 30. The reaction chamber may alternatively be arranged with its axis horizontal and a knife 14 reciprocates horizontally, so that the discharged material falls through the opening $e$ on to the conveyor 23.

338,079. Treating Phosphates. Kunstdünger-Patent-Verwertungs-Akt.-Ges., Glarus, Switzerland. International Convention date, March 7, 1929.

Phosphate rock is leached with nitric acid and potassium sulphate, diluted with a solution of phosphoric acid and potassium nitrate from a previous operation, which has been partly freed from potassium nitrate by crystallisation. By this means the precipitation of calcium sulphate containing a high percentage of potassium is prevented. Calcium sulphate containing one half molecule of water of crystallisation is precipitated and changes to the dihydrate on cooling. The liquor is then neutralised with ammonia, and a mixture of potassium nitrate with mono- or di-ammonium phosphate, is obtained for use as a fertiliser.

338,095. Dyeing Processes. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, April 9, 1930. Addition to 304,739. (See The Chemical Age, Vol. XX, p. 320).

Cellulose esters or ethers are dyed greenish-yellow with compounds non-sulphonated in the nucleus, of the general formula




where X is a substituted or unsubstituted amino group. These compounds are obtained by treating 4-amino-1:8-naphthalic anhydride with hydrazine or a derivative.

338,104. Dyes. W. W. Groves, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, February 11, 1930. Addition to 334,878.

The stable reduction products of 4:4¹ di-methyl-6:6¹-dihalogen-thio-indigos described in Specification No. 334,878 (See The Chemical Age, Vol. XXIII, p. 460) are obtained by hydrogenation under pressure in the presence of a nickel catalyst and sodium carbonate.

338,126. Hydroxy-Arylmethanes. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 9, 1929.

*o*-Oxy-di- and *o*-oxy-tri-arylmethanes are chlorinated and brominated to obtain compounds for moth-proofing wool, fur, or hair. These compounds may be added to dye baths. Examples are given of the treatment of 2:2¹-di-oxy-5:5¹-dichlor-diphenyl-methane, *o*-hydroxy-diphenylmethane, 3:5-di-chlor-2-hydroxy-diphenyl-methane and others.

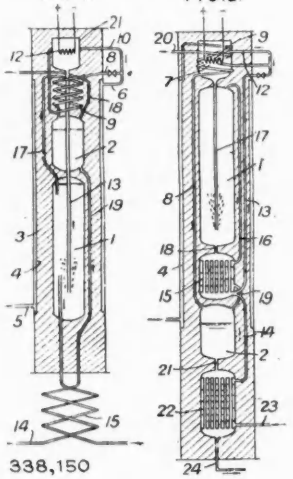
338,152. Synthetic Rubber. J. Y. Johnson. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, May 14, 1929.

Diolefines are polymerized with at least 30 per cent. of an inorganic oxygen-containing acid or an organic derivative, such as sulphuric acid, phosphoric acid, benzene sulphonic acid, toluene sulphonic acid, *p*-toluene sulpho-chloride, benzene sulpho-chloride, the products varying with the conditions of the reaction. In the case of low temperature, short time of reaction, or a low concentration of acid, oily or semi-solid products are obtained which become harder with longer or more energetic action. The products are used as adhesives, additions to paints, or for making rubber-like products. In an example, butadiene is treated with 68 per cent. sulphuric acid at −10° C. and the mixture stirred at −7° C. till the reaction is complete. The mixture is poured on ice, volatile products removed by steam, and the residue dissolved in cyclohexane, washed with water, and sodium carbonate solution. The solvent is distilled off, leaving viscous oil distilling at 150°—300° C., the resinous residue of which is soluble in organic solvents. Other examples are given of the treatment of butadiene with benzene sulphonic acid under pressure, and with phosphoric acid, the products being viscous oils.

338,150. DESTRUCTIVE HYDROGENATION. W. R. Tate and H. P. Stephenson, Norton Hall, The Green, Norton-on-Tees, Durham, and Imperial Chemical Industries, Ltd., Millbank, London. Application date, August 13, 1929.

Oils or suspensions of coal in oils are hydrogenated in a vertical reaction vessel, and the liquid and vapour products

FIG.1. FIG.2.



338,150

are separated in another vessel, both vessels being arranged in the same high pressure vessel. The products are cooled by employing them to preheat the liquid or gaseous materials. The reaction vessel 1 and separator, Figure 1, are arranged within a high pressure vessel 3 having a jacket 4 through which the hydrogen passes. Part of the hydrogen then passes through pipe 10 to a chamber 21 containing an electric heater 12, and the other part passes through a preheater 9, where it is preheated by the reaction products passing through pipe 17. The hydrogen passes by pipe 13 into the reaction chamber 1. The reaction products are cooled from 420° to 300° C. by passage through the preheater, and the heavy oils leave the separator 2 by pipe 19, while the vapours of light and middle oils leave by pipe 18. The heavy oils serve to heat fresh materials entering by pipe 14, and may then be returned for further treatment. In a modification, Figure 2, hydrogen from the jacket 4 is preheated at 7 by the reaction vapour which passes by pipe 8 from separator 2. The hydrogen is divided into two parts, one passing over an electric heater 9, and thence by pipe 17 to the base of the reaction chamber 1, and the other by pipe 13 to tubular pre-heater 15, heated by the reaction products which pass through pipe 16, and thence to the separator 2. The liquid products pass by pipe 21 to a tubular preheater 22, through which the fresh material passes, and thence by pipe 14 to preheater 15 and reaction chamber 1.

338,178. METAL HYDROXIDES. R. S. Carreras, 289, Diputación, Barcelona, Spain. Application date, July 9, 1929.

Zinc, copper and antimony hydroxides are obtained by electrolysing a dilute solution of sodium or potassium chlorate saturated with carbon dioxide, using an anode of the metal. The electrolyte is continuously withdrawn without removing the hydroxide, saturated again with carbon dioxide, and returned. The chlorate remains unaltered. The resulting hydroxide contains a small proportion of the carbonate.

338,182. DYES, J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 7, 1929.

Anthraquinone-2:1-benzacridones halogenated at least in the Bz4-position and having the Bz2-position free, are treated with halogenating agents in the presence of organic solvents. Alternatively these products are obtained by condensing 1:4-dihalogen-anthraquinone-2-carboxylic acids or their esters with 2:3:4-trihalogenanilines, followed by acridone ring closure. In an example, Bz3:4:5-trichloranthraquinone-2:1-benzacridone is treated with sulphuryl chloride in the presence of nitrobenzene. In another example, 1:4-dichloranthraquinone-2-carboxlyic acid benzyl ester is heated with 2:3:4-trichloraniline, and the product saponified and ring-closed. The products dye in red shades.

338,187, ALIPHATIC ACIDS. H. Dreyfus, 22, Hanover Square, London. Application date, August 12, 1929.

Acetic, propionic, and other lower aliphatic acids are concentrated by extracting with ether, ethyl acetate or acetone oil, and a water precipitant then added, such as petroleum distillates, benzene, carbon tetrachloride, chloroform, dichlorethylene, tri-chlorethylene, acetylene tetrachloride. The extraction may be effected in counter-current, and the precipitation of water in a mixer. An example of the treatment of acetic acid is given.

338,192. DESTRUCTIVE HYDROGENATION. H. D. Elkington, London. From Naamlooze Vennootschap de Bataafsche. Petroleum Maatschappij, 30, Carel van Bylandtlaan, The Hague. Application date, August 14, 1929.

Coal tar, petroleum products, lignite, cellulose, etc., are heated with hydrogen under pressure in the presence of a molybdenum compound on charcoal or finely divided coal. Ammonium molybdate solution is acidified with sulphuric acid and treated with sulphuretted hydrogen, yielding a blue colloidal solution to which absorbent material such as "Carboraffin" or finely divided brown coal is added to absorb the colloidal matter. The absorbent is then filtered off, washed and dried. Examples are given of the treatment of brown coal, gas oil, and a mixture of the two.

338,216–7. DYES. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application dates, July 5 and 6, 1929.

338,216. 1-Halogen-anthraquinone-2-carboxylic acids are condensed with 3 : 5-dihalogen-anilines and 2 : 3 : 4 : 5-tetrahalogen-anilines to obtain Bz2 : 4-dihalogen- and Bz2 : 3 : 4 : 5-tetrahalogen-anthraquinone-2 : 1-benzacridones respectively. The latter may also be obtained by treating anthraquinone-2:1-benzacridones halogenated at least in the Bz2 : 4-positions, but not completely halogenated in the benzene nucleus, with brominating agents, or with chlorinating agents followed by agents replacing halogen by hydrogen, or by treating 4 : Bz2 : 3 : 4 : 5-pentahalogen-anthraquinone-2 : 1 : -benzacridones (see 338,217 below) with agents replacing halogen by hydrogen. Some examples are given.

338,217. 1 : 4-Dihalogen-anthraquinone-2-carboxylic acids or their esters are condensed with tetra-halogen-anilines having a free *o*-position to the amino group, followed by ring closure. The products are 4 : Bz2 : 3 : 4 : 5-pentahalogen-anthraquinone-2 : 1-benzacridones, and they may also be obtained by halogenating anthraquinone-2 : 1-benzacridones containing halogen at least in the Bz2- and Bz4-positions. Examples are given, and the products dye red shades.

338,240. DYE INTERMEDIATES. W. W. Groves, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, August 27, 1929.

A *p*-alkyl, chloro-, or alkoxy-substituted, or unsubstituted nitroso-benzene is condensed with an *o*-alkyl-, chloro-, or alkoxy-substituted or unsubstituted nitroso-benzene, at least one nucleus being substituted, and the product reduced, *e.g.*, with sodium sulphide. The products are 4-amino-diphenylamine derivatives substituted in the 3- or $4^1$- positions.

338,262 STYROLS. A. Carpmael, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, September 10, 1929.

Styrol and its homologues are obtained by heating methyl-phenyl-carbinol or the symmetrical ether or a corresponding homologous compound in the presence of aluminium, thorium, tungsten or tin oxides, zinc or aluminium shavings, or aluminium phosphate, to a temperature of 250°–400° 3C.

338,314. DYE INTERMEDIATES. W. W. Groves, London. From I.G. Farbenindustrie Akt.-Ges, Frankfort-on-Main, Germany. Application date, October 18, 1929.

A diaryl-urea-dicarboxylic acid $CO\text{-}(NH\text{-}R\text{-}COOH)_2$ or the corresponding acid chloride is condensed with an aminophenol $H_2N\text{-}R_1\text{-}OH$ in the presence of a dehydrating agent to obtain urea derivatives of the formula

$$CO\begin{matrix}\diagup NH\text{-}R\text{-}CO\text{-}NH\text{-}R_1\text{-}OH \\ \diagdown NH\text{-}R\text{-}CO\text{-}NH\text{-}R_1\text{-}OH\end{matrix}$$

where R and $R_1$ are aromatic residues of the benzene or naphthalene series which may contain substituents but no

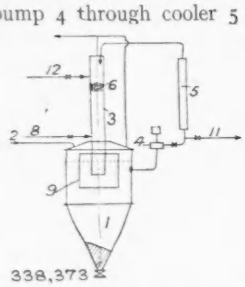
free sulphonic or carboxylic acid group and in which at least one *o*- or *p*-position relative to the hydroxyl group is free. Thus diphenylurea-*p*-*p*$^1$-dicarboxylic acid is condensed with *p*-amino-phenol by the action of phosphorus trichloride in dimethylaniline solution. Other examples are given. The alkali salts are used for impregnating cotton goods for production of azo dyes on the fibre.

338,329. ACETIC ACID. Soc. Française de Catalyse Généralisée, 30, Avenue des Champs Elysées, Paris. International Convention date, January 26, 1929.

Acetic acid is produced from carbon monoxide and hydrogen at 500°–550° C. and 450–600 atmospheres pressure, employing as catalysts phosphates, borates or silicates of nickel, cobalt, chromium, iroo nr copper.

338,373. AMMONIUM SULPHATE. Union Chimique Belge Soc. Anon., 61, Avenue Louise, Brussels. International Convention date, May 17, 1929. Addition to 307,037 (See THE CHEMICAL AGE, Vol. XX, p. 454.)

Ammonium sulphate solution is drawn from a vessel 1 and forced by a pump 4 through cooler 5 to a column 3,



338,373

having a packing 6. Gaseous or liquid ammonia is supplied through pipes 8 or 12 to the column, and the liquor passes into an open-ended cylinder 9, in which precipitation of crystals takes place, and the crystals fall into the vessel 1. Some of the solution is withdrawn from the vessel 1 through pipe 11, treated with carbon dioxide and gypsum to enrich it with ammonium sulphate, and then returned.

NOTE.—Abstracts of the following specifications which are now accepted, appeared in THE CHEMICAL AGE when they became open to inpection under the International Convention: —313,094 (I.G. Farbenindustrie Akt.-Ges.), relating to dyestuffs, see Vol. XXI, p. 136; 319,247 (I.G. Farbenindustrie Akt.- Ges.), relating to azo dyestuffs, see Vol. XXI, p. 533.

### Specifications Accepted with Date of Application

314,075. Ferric oxide, Production of. Sulphur and Smelting Corporation. June 22, 1928.

319,794. Pyracridone, Manufacture of. I.G. Farbenindustrie Akt.-Ges. September 29, 1928.

340,231. Determining the potassium content in spaces containing potassium. W. Kolhorster. August 12, 1929.

340,232. Cleansing agents. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). August 17, 1929.

340,233. Ketones, Manufacture of. H. Dreyfus. August 19, 1929.

340,235. Carbon, Production of by the dissociation of gases. S. Percival. (*C. Hostmannsteinbergsche Farbenfabriken Ges.*). Spteember 12, 1929.

340,237. 1 : 2 : 4 : triazoles, Manufacture of. A. Boehringer, G. Scheuing and B. Walach. September 16, 1929.

340,239. Carbon-black, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). September 17, 1929.

340,243. Azo dyestuffs containing chromium, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). September 19, 1929.

340,262. Dibenzanthrones and isodibenzanthrones containing chlorine and bromine, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*). June 21, 1929.

340,267. Dyeing with vat dyestuffs. J. E. C. Harris, J. Morton, and Morton Sundour Fabrics, Ltd. June 19, 1929.

340,276. Low-temperature distillation of carbonaceous materials, Apparatus for. A. S. Ramage. September 17, 1929.

340,293. High molecular hydrocarbons, Preparation of. J. Y. Johnson. (*I G. Farbenindustrie Akt.-Ges.*). July 27, 1929.

340,318–9. Wool, fur, hair and the like, Protection of against textile pests. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges*). September 27, 1929.

340,331–2. Aluminium alloy. H. C. Hall and T. F. Bradbury. October 1, 1929. Additions to 323,353.

340,334. Fast vat dyestuffs, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*). October 1, 1929.

340,338. Recovery of utilisable products from the residues obtained from the distillation of oil of turpentine, gum, resins, and like resinous substances. E. B. Feldman. October 4, 1929.

340,370. Continuous distillation of mineral oils and the like, Method and means of. Soc. pour l'Exploitation des l'Procédés Ab-Der-Halden. January 17, 1929.

340,382. Alloy steels. L. Allen and Co., Ltd., Chatwood Safe Co., Ltd., and L. K. Everitt. November 20, 1929.

340,435. Alkaline earth cyanamides, Preparation of. N. Caro and A. R. Frank. February 8, 1929.

340,451. Obtaining light metals by electrolysis, Apparatus for. Soc. of Chemical Industry in Basle. August 29, 1929.

### Applications for Patents

*[In the case of applications for patents under the International Convention, the priority date (that is, the original application date abroad which the applicant desires shall be accorded to the patent) is given in brackets, with the name of the country of origin. Specifications of such applications are open to inspection at the Patent Office on the anniversary of the date given in brackets, whether or not they have been accepted.]*

Arundel, H., Davies, G. P., and Imperial Chemical Industries, Ltd. Manufacture of picric acid. 470. January 6.

Boot's Pure Drug Co., Ltd., and Howitt, F. O. Production of organic gold derivatives. 509. January 6.

Byrne, B. J. Destructive hydrogenation of carbonaceous materials. 352. January 5.

Carpmael, A. (*I.G. Farbenindustrie Akt.-Ges.*). Manufacture of sulphurised phenols. 750. January 8.

—— Manufacture of aromatic monoaroyldiamines. 751. January 8.

Chemische Fabrik vorm. Sandoz. Preparation of stable tetrazomonoazo compounds. 498. January 6. (Germany, January 7, 1930.)

—— Manufacture of wetting-out preparations. 831. January 9. (Germany, January 15, 1930.)

Frank, A. R. Preparing concentrated nitric acid. 386. January 5. (December 6, 1929.)

I.G. Farbenindustrie Akt.-Ges. and Johnson, J. Y. Manufacture of alkali metal carbonates. 365. January 5.

—— Apparatus for carying out pyrogenic gas reactions with hydrocarbons. 366. January 5.

—— Manufacture of alkyl ethers of amino-beta-hydroxyanthraquinones. 367. January 5.

—— Apparatus for removing carbon deposits in electric arc furnaces. 584. January 7.

—— Manufacture of wax-like substances. 799. January 9.

—— Manufacture of alkali metal carbonates. 800. January 9.

—— Manufacture of ammonium sulphate nitrate stable for storage. 801. January 9.

—— Manufacture of margarine. 802. January 9.

—— Manufacture of emulsifying, wetting, etc., agents. 905. January 10.

I.G. Farbenindustrie Akt.-Ges. Manufacture of acetic anhydride. 512. January 6.

—— Separating mixtures of rare gases. 589. January 7. (Germany, January 7, 1930.)

—— Manufacture of halogenated alcohols. 610. January 7.

Imperial Chemical Industries, Ltd. Production of lubricating-oils. 353. January 5.

Imperial Chemical Industries, Ltd., and McGlynn, R. P. Sulphonated fatty-aromatic condensation products. 354. January 5.

Imperial Chemical Industries, Ltd. Polishing and cleaning compositions. 688. January 8. (United States, January 8, 1930.)

—— Electric welding. 739. January 8.

Imperial Chemical Industries, Ltd., and Strong, H. W. Destructive hydrogenation of carbonaceous materials. 740. January 8.

Imperial Chemical Industries, Ltd. Production of hydrogen, etc. 741. January 8.

—— Artificial mordanting-substances. 933. January 10.

Leithauser, H. Removal of ammonia and sulphuretted hydrogen from gases. 404. January 5. (Germany, January 6, 1930.)

Schering-Kahlbaum Akt.-Ges. Manufacture of hydroaromatic alcohols. 609. January 7. (Germany, January 25, 1930.)

—— Manufacture of hydro-aromatic carboxylic acids. 842. January 9. (Germany, January 11, 1930.)

Schidrowitz, P., and Ungar, R. M. Manufacture of rubber. 850. January 9.

—— Manufacture of sheet rubber. 851. January 9.

Silesia Verein Chemischer Fabriken. Production of diarylguanidines. 628. January 7. (Germany, November 27, 1930.)

Soc. of Chemical Industry in Basle. Manufacture of trialkoxy derivatives of phenylethylamine. 619. January 7. (Switzerland, January 8, 1930.)

Standard Oil Development Co. Producing lubricants by hydrogenation of hydrocarbon oils. 558. January 7. (United States, January 8, 1930.)

Usines de Melle. Manufacture of substitute for amyl alcohol. 500. January 7. (France, January 7, 1930.)

# Weekly Prices of British Chemical Products

***The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.***

## General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID CHROMIC.—1s. per lb., less 2½% d/d U.K.

ACID HYDROCHLORIC.—Spot, 3s. 9d. to 6s. carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° Tw.—Spot, £20 to £25 per ton makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA (ANHYDROUS).—Spot, 11d. per lb., d/d in cylinders.

AMMONIUM BICHROMATE.—8⅛d. per lb. d/d U.K.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER, 35/37%.—Spot, £7 10s. per ton d/d station in casks, special terms for contracts.

BORAX, COMMERCIAL.—Crystals, £13 10s. per ton; granulated, £12 10s. per ton; powder, £14 per ton. (Packed in 1 cwt. bags. carriage paid any station in Great Britain. Prices quoted are for one ton lots and upwards).

CALCIUM CHLORIDE (SOLID), 70/75%.—Spot, £4 15s. to £5 5s. per ton d/d in drums.

CHROMIUM OXIDE.—9d. to 9½d. per lb. according to quantity d/d U.K.

CHROMETAN.—Crystals, 3¼d. per lb. Liquor, £18 12s. 6d. per ton d/d U.K.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 7d. to 1s. 11d. per gall. pyridinised industrial, 1s. 9d. to 2s. 1d. per gall.; mineralised, 2s. 8d. to 2s. 11d. per gall. 64 O.P., 1d. extra in all cases. Prices according to quantity.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE CRYSTALS AND GRANULAR.—4¼d. per lb. nett d/d U.K., discount according to quantity; ground ½d. per lb. extra.

POTASSIUM CHLORATE.—3¾d. per lb., ex-wharf, London, in cwt. kegs.

POTASSIUM CHROMATE.—8⅛d. per lb. d/d U.K.

SALAMMONIAC.—Firsts lump, spot, £42 10s. per ton d/d station in barrels. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE, UNGROUND.—Spot, £3 7s. 6d. per ton d/d station in bulk.

SODA ASH, 58° E.—Spot, £6 per ton, f.o.r. in bags, special terms for contracts.

SODA CAUSTIC, SOLID, 76/77°E.—Spot, £14 10s. per ton, d/d station.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton, d/d station or ex depot in 2-cwt bags.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE, REFINED.—Spot, £10 10s. per ton d/d station in bags.

SODIUM BICHROMATE CRYSTALS (CAKE AND POWDER)—3¼d. per lb. nett d/d U.K., discount according to quantity. Anhydrous ¾d. per lb. extra.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included: £15 10s. f.o.b. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM CHROMATE.—3⅜d. per lb. d/d U.K.

SODIUM NITRITE.—Spot, £19 per ton, d/d station in drums.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SILICATE, 140° Tw.—Spot, £8 5s. per ton, d/d station returnable drums.

SODIUM SULPHATE (GLAUBER SALTS).—Spot, £4 2s. 6d. per ton, d/d address in bags.

SODIUM SULPHIDE SOLID, 60/62%.—Spot, £10 5s. per ton d/d station in drums. Crystals—Spot, £7 10s. per ton d/d station in casks.

SODIUM SULPHITE, PEA CRYSTALS.—Spot, £13 10s. per ton, d/d station in kegs. Commercial—Spot, £9 per ton, d/d station in bags.

## Coal Tar Products

ACID CARBOLIC CRYSTALS.—5d. to 6½d. per lb. Crude 60's 1s. 4d. to 1s. 6d. per gall. August/December.

ACID CRESYLIC 99/100.—2s. per gall. B.P., 4s. per gall. 97/99.—Refined, 2s. 3d. to 2s. 5d. per gall. Pale, 98%, 1s. 9d. to 1s. 11d. Dark, 1s. 4d. to 1s. 5d.

ANTHRACENE OIL, STRAINED (GREEN OIL).—4½d. to 4¾d. per gall.

BENZOLE.—Prices at works: Crude, 7½d. to 8½d. per gall.; Standard Motor, 1s. 3d. to 1s. 4d. per gall.; 90%, 1s. 4½d. to 1s. 5½d. per gall.; Pure, 1s. 7½d. to 1s. 8½d. per gall. (The above prices were operative from October 21 last).

TOLUOLE.—90%, 1s. 9d. to 1s. 10d. per gall. Pure, 1s. 11d. to 2s. per gall.

XYLOL.—1s. 8d. to 1s. 9d. per gall. Pure, about 1s. 11d. per gall.

CREOSOTE.—Standard specification, for Export, 5½d. to 6d. per gall. f.o.b.; for Home, 4d. per gall. d/d.

NAPHTHA.—Solvent, 90/160, 1s. 3d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 5d. per gall. Solvent, 90/190, 1s. to 1s. 2d. per gall.

NAPHTHALENE.—Purified Crystals, £11 11s. per ton.

PITCH.—Medium soft, 45s. to 47s. 6d. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 3s. 6d. to 3s. 9d. per gall. 90/160, 3s. 6d. to 3s. 9d. per gall. 90/180, 1s. 9d. to 2s. per gall.

## Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:—

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID GAMMA.—Spot, 3s. 9d. per lb. 100% d/d buyer's works.

ACID H.—Spot, 2s. 3d. per lb. 100% d/d buyer's works.

ACID NAPHTHIONIC.—1s. 5d. per lb. 100% d/d buyer's works.

ACID NEVILLE AND WINTHER.—Spot, 2s. 7d. per lb. 100% d/d buyer's works.

ACID SULPHANILIC.—Spot, 8½d. per lb. 100% d/d buyer's works.

ANILINE OIL.—Spot, 8½d. per lb., drums extra, d/d buyer's works.

ANILINE SALTS.—Spot, 8½d. per lb. d/d buyer's works.

BENZALDEHYDE.—Spot, 1s. 8d. per lb., packages extra, d/d buyer's works.

BENZIDINE BASE.—Spot, 2s. 6d. per lb. 100% d/d buyer's works.

BENZOIC ACID.—Spot, 1s. 8½d. per lb. d/d buyer's works.

*o*-CRESOL 30/31° C.—£2 6s. 5d. per cwt., in 1-ton lots.

*m*-CRESOL 98/100%.—2s. 9d. per lb., in ton lots.

*p*-CRESOL 34·5° C.—1s. 9d. per lb., in ton lots.

DICHLORANILINE.—2s. 5d. per lb.

DIMETHYLANILINE.—Spot, 1s. 8d. per lb., drums extra d/d buyer's works.

DINITROBENZENE.—7½d. per lb.

DINITROCHLORBENZENE.—£74 per ton d/d.

DINITROTOLUENE.—48/50° C., 7d. per lb.; 66/68° C., 7¾d. per lb.

DIPHENYLAMINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

*a*-NAPHTHOL.—Spot, 1s. 11d. per lb. d/d buyer's works.

*B*-NAPHTHOL.—Spot, £65 per ton in 1 ton lots, d/d buyer's works.

*a*-NAPHTHYLAMINE.—Spot, 1s. per lb. d/d buyer's works.

*B*-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb. d/d buyer's works.

*o*-NITRANILINE.—5s. 11d. per lb.

*m*-NITRANILINE.—Spot, 2s. 6d. per lb. d/d buyer's works.

*p*-NITRANILINE.—Spot, 1s. 8d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 6½d. per lb., 5-cwt. lots, drums extra, d/d buyer's works.

NITRONAPHTHALENE.—9d. per lb.

R. SALT.—Spot, 2s. per lb. 100% d/d buyer's works.

SODIUM NAPHTHIONATE.—Spot, 1s. 6½d. per lb. 100% d/d buyer's works.

*o*-TOLUIDINE.—Spot, 8d. per lb., drums extra, d/d buyer's works.

*p*-TOLUIDINE.—Spot, 1s. 9d. per lb. d/d buyer's works.

*m*-XYLIDINE ACETATE.—3s. 4d. per lb., 100%.

## Wood Distillation Products

ACETATE OF LIME.—Brown, £7 10s. to £8 per ton. Grey, £14 to £15 per ton. Liquor, 9d. per gall.

ACETONE.—£74 to £75 per ton.

CHARCOAL.—£6 5s. to £8 3s. per ton, according to grade and locality.

IRON LIQUOR.—10d. to 1s. 2d. per gall.

RED LIQUOR.—8d. to 10d. per gall.

WOOD CREOSOTE.—1s. 9d. per gall., unrefined.

WOOD NAPHTHA, MISCIBLE.—2s. 11d. to 3s. 1d. per gall. Solvent, 4s. per gall.

WOOD TAR.—£4 5s. per ton.

BROWN SUGAR OF LEAD.—£37 per ton.

## Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6d. to 1s. 2d. per lb., according to quality; Crimson, 1s. 3d. to 1s. 5d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 8d. to 1s. 10d. per lb.

BARYTES.—£6 to £7 10s. per ton, according to quality.

CADMIUM SULPHIDE.—4s. 6d. to 5s. per lb.

CARBON BISULPHIDE.—£26 to £28 per ton, according to quantity; drums extra.

CARBON BLACK.—3¼d. to 4 1/16d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£40 to £50 per ton, according to quantity. drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—2s. 6d. per lb.

INDIARUBBER SUBSTITUTES, WHITE.—4¾d. to 5½d. per lb.; Dark, 4½d. to 5d. per lb.

LITHOPONE, 30%.—£20 to £22 per ton.

SULPHUR.—£9 10s. to £13 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra.

SULPHUR PRECIP. B.P.—£55 to £60 per ton, according to quantity.

VERMILION, PALE OR DEEP.—6s. 6d.–7s. per lb.
ZINC SULPHIDE.—8d. to 11d. per lb.

### Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£38 5s. per ton, for ½ ton lots, £37 5s. for 1 ton, smaller quantities £39 5s., delivered, barrels free.
ACID, ACETYL SALICYLIC.—2s. 7d. to 2s. 9d. per lb., according to quantity.
ACID, BENZOIC B.P.—2s. to 2s. 3d. per lb., for synthetic product, according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz.; 50-oz. lots, 1s. 3d. per oz.
ACID, BORIC B.P.—Crystal, £31 per ton; powder, £32 per ton; For one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—1s. 1½d. per lb., less 5%.
ACID, GALLIC.—2s. 11d. per lb. for pure crystal, in cwt. lots.
ACID, MOLYBDIC.—5s. 3d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 5d. to 1s. 8d. per lb. Technical.—1s. to 1s. 2d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 0½d. per lb., less 5%.
AMIDOL.—7s. 6d. to 11s. 3d. per lb., according to quantity.
AMMONIUM BENZOATE.—3s. 9d. per lb.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5-cwt. casks. Resublimated, 1s. per lb.
AMMONIUM MOLYBDATE.—4s. 9d. per lb. in ½-cwt. lots. Packages extra. Special prices for quantities and contracts.
ARGENT. NITRAS, CRYSTALS.—1s. 1d. per oz.
ATROPHINE SULPHATE.—8s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BISMUTH CARBONATE.—7s. 6d. per lb.
BISMUTH CITRATE.—7s. 6d. per lb.
BISMUTH SALICYLATE.—7s. 3d. per lb.
BISMUTH SUBNITRATE.—6s. 6d. per lb.
BISMUTH NITRATE.—Cryst. 5s. per lb.
BISMUTH OXIDE.—9s. 6d. per lb.
BISMUTH SUBCHLORIDE.—8s. 9d per lb.
BISMUTH SUBGALLATE.—7s. 3d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W. Qts. 11d. per lb. Liquor Bismuth B.P., in W. Qts., 1s. 2d. per lb.; 6 W. Qts., 11½d. per lb.; 12 W. Qts., 10d. per lb.; 36 W. Qts., 9½d. per lb.
BORAX B.P.—Crystal, £21 10s. per ton; powder, £22 per ton; for one-ton lots and upwards. Packed in 1-cwt. bags carriage paid any station in Great Britain.
BROMIDES.—Ammonium, 1s. 9d. per lb.; potassium, 1s. 4½d. per lb.; granular, 1s. 5d. per lb.; sodium, 1s. 7d. per lb. Prices for 1-cwt. lots.
CAFFEIN, PURE.—6s. 6d. per lb.
CAFFEIN CITRAS.—5s. per lb.
CALCIUM LACTATE.—B.P., 1s. to 1s. 4d. per lb., in 1-cwt. lots.
CAMPHOR.—Refined flowers, 2s. 10d. to 3s. per lb., according to quantity; also special contract prices.
CHLOROFORM.—2s. 4½d. to 2s. 7½d. per lb., according to quantity.
EMETINE HYDROCHLORIDE.—58s. 6d. per oz.
EMETINE BISMUTH IODIDE.—33s. per oz.
EPHEDRINE, PURE.—12s. 6d. to 13s. 6d. per oz.
EPHEDRINE HYDROCHLORIDE.—9s. 9d. to 10s. 6d. per oz.
EPHEDRINE SULPHATE.—9s. 9d. to 10s. 6d. per oz.
ERGOSTEROL.—2s. 6d. per gm.
ETHERS.—S.G. ·730—1s. to 1s. 1d. per lb., according to quantity; other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GLUCOSE, MEDICINAL.—1s. 6d. to 2s. per lb. for large quantities.
HEXAMINE.—2s. 3d. to 2s. 6d. per lb.
HOMATROPINE HYDROBROMIDE.—27s. 6d. per oz.
HYDRASTINE HYDROCHLORIDE.—90s. per oz. for small quantities.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 3s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 11d. to 3s. 4d. per lb.; potassium, 3s. 2d. to 3s. 7d. per lb.; sodium, 3s. 1d. to 3s. 6d. per lb.; to 128-lb. lots.
IRON AMMONIUM CITRATE.—B.P., 1s. 11d. per lb., for 28-lb. lots. Green, 2s. 6d. per lb., list price. U.S.P., 2s. 9d. per lb. list price.
IRON PERCHLORIDE.—18s. to 20s. per cwt. according to quantity.
IRON QUININE CITRATE.—B.P., 8¼d. to 8¾d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light Commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 14s. 3d. per lb. net; Synthetic, 8s. 6d. to 12s. per lb.; Synthetic detached crystals, 8s. 6d. to 10s. 3d. per lb., according to quantity; Liquid (95%), 9s. per lb.
MERCURIALS B.P.—Up to 1-cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 5d per lb.
PARAFORMALDEHYDE.—1s. 8d. per lb.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—3s. 9d. to 4s. 1d. per lb.
PHENOLPHTHALEIN.—5s. 11d. to 6s. 1½d. per lb.
PILOCARPINE NITRATE.—10s. 6d. per oz.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—88s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P., 1s. 9d. per lb. for 28-lb. lots.
POTASSIUM FERRICYANIDE.—1s. 7½d. per lb., in 125-lb. kegs.
POTASSIUM IODIDE.—16s. 8d. to 17s. 9d. per lb., as to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1 cwt. kegs included, f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. per oz. for 1,000-oz. lots.
QUINOPHAN.—B.P.C., 14s. 6d. to 16s. 6d. per lb. for cwt. lots.
SACCHARIN.—43s. 6d. per lb.
SALICIN.—18s. 6d. per lb.
SODIUM BARBITONUM.—8s. 6d. to 9s. per lb. for 1-cwt. lots.
SODIUM BENZOATE B.P.—1s. 9d. per lb. for 1-cwt. lots.
SODIUM CITRATE.—B.P.C. 1911, 1s. 6d. per lb. B.P.C. 1923, and U.S.P., 1s. 10d. per lb. for 28-lb.. lots.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—85s. per cwt. net, ton lots, d/s of 5 cwt. Crystals, 2s. 6d. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 10d. to 2s. 2d. per lb. Crystal, 1s. 11d. to 2s. 3d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 2d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £29 10s. per ton, according to quantity. Delivered U.K.
STRYCHNINE, ALKALOID CRYSTAL, 2s. per oz.; hydrochloride, 1s. 9½d. per oz.; nitrate, 1s. 8d. per oz.; sulphate, 1s. 9d. per oz., for 1,000-oz. quantities.
TARTAR EMETIC, B.P.—Crystal or powder, 1s. 9d. to 2s. per lb.
THYMOL.—Puriss, 7s. 3d. to 8s. per lb., according to quantity. Natural, 12s. per lb.

### Perfumery Chemicals

ACETOPHENONE.—7s. per lb.
AUBEPINE (EX ANETHOL).—9s. per lb.
AMYL ACETATE.—2s. 3d. per lb.
AMYL BUTYRATE.—4s. 9d. per lb.
AMYL CINNAMIC ALDEHYDE.—9s. per lb.
AMYL SALICYLATE.—2s. 6d. per lb.
ANETHOL (M.P. 21/22° C.).—6s. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 9d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 9d. per lb.
BENZYL BENZOATE.—2s. 4d. per lb.
CINNAMIC ALDEHYDE NATURAL.—13s. 3d. per lb.
COUMARIN.—12s. per lb.
CITRONELLOL.—6s. 6d. per lb.
CITRAL.—6s. 6d. per lb.
ETHYL CINNAMATE.—6s. 6d. per lb.
ETHYL PHTHALATE.—2s. 6d. per lb.
EUGENOL.—8s. 9d. per lb.
GERANIOL.—7s. 6d. to 10s. per lb.
HELIOTROPINE.—6s. per lb.
ISO EUGENOL.—10s. 9d. per lb.
LINALOL, EX BOIS DE ROSE.—6s. per lb. Ex Shui Oil, 6s. per lb.
LINALYL ACETATE, EX BOIS DE ROSE.—8s. 6d. per lb. Ex Shui Oil, 8s. 6d. per lb.
MUSK KETONE.—30s. per lb.
MUSK XYLOL.—6s. 3d. per lb.
PHENYL ETHYL ACETATE.—10s. per lb.
PHENYL ETHYL ALCOHOL.—9s. per lb.
RHODINOL.—42s. per lb.
SAFROL—1s. 3d. per lb.

### Prices of Essential Oils

BERGAMOT OIL.—8s. 9d. per lb.
BOURBON GERANIUM OIL.—15s. per lb.
CASSIA OIL, 80/85%.—4s. 3d. per lb.
CINNAMON OIL LEAF.—6s. 3d. per oz.
CITRONELLA OIL.—Java, 2s. 4d. per lb., c.i.f.
CLOVE OIL, 90/92%.—8s. 3d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 9s. per lb.
LEMON OIL.—4s. 3d. per lb.
PEPPERMINT OIL.—Japanese, 4s. 6d. per lb.

# London Chemical Market

***The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co. Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.***

*London, January* 15, 1931.

THERE is a great improvement in the amount of business booked during the current week and prices remain on the whole firm. Export business has also shown improvement.

### General Chemicals

ACETONE.—Unchanged at £60 to £65 per ton, with a satisfactory demand.

ACID ACETIC.—Continues firm at £36 5s. to £38 5s. for technical 80% and £37 5s. to £39 5s. per ton for pure 80%, with a good steady demand.

ACID CITRIC.—Continues easy at about 1s. 2d. to 1s. 2½d. per lb., less 5%.

ACID FORMIC.—Steady at about £38 per ton for 85%, and with a fairly good demand.

ACID LACTIC.—£41 to £42 per ton for the 50% by weight, pale quality, and in steady request.

ACID OXALIC.—Continues firm at £30 7s. 6d. to £32 per ton, according to quantity.

ACID TARTARIC.—Much firmer at 1s. 0¼d. to 1s. 1¼d. less 5%.

ALUMINA SULPHATE.—£7 15s. to £8 5s. per ton for the 17/18% iron free quality.

ARSENIC.—Continues firm at £19 to £19 10s. per ton.

CREAM OF TARTAR.—Slightly easier at 87s. 6d. per cwt., ex warehouse London.

COPPER SULPHATE.—Steady at £22 to £22 10s. per ton, less 5%, free on rails, London.

FORMALDEHYDE.—Steady at about £31 per ton, ex warehouse London, and in good request.

LEAD ACETATE.—Lower at £33 15s. per ton for brown and £34 15s. for white, with a little better inquiry.

LEAD NITRATE.—£29 10s. per ton, rather quiet.

LITHOPONE.—Steady at £18 to £22 per ton according to grade and quantity.

POTASSIUM BICHROMATE.—Firm at 4¼d. per lb., with the usual discounts for contracts.

PERMANGANATE OF POTASH NEEDLE CRYSTALS B.P.—Continues firm at 5½d. per lb., and in steady demand.

SODA BICHROMATE.—Firm at 3½d. per lb., net, with the usual discounts for contracts, and in steady demand.

SODA CHLORATE.—Firm at about £25 per ton, with a good demand.

SODIUM HYPO SULPHITE.—Commercial crystals £8 10s. per ton, photographic crystals £14 5s. per ton.

SODIUM SULPHIDE.—£10 5s. to £11 5s. per ton for solid, with broken at £1 per ton extra, carriage paid.

TARTAR EMETIC.—Quiet at about 11d. per lb.

ZINC SULPHATE.—Quiet at £11 to £11 10s. per ton.

### Coal Tar Products

THERE is little or no change to report in the coal tar products market, and prices remain unaltered from last week.

MOTOR BENZOL.—Quoted at about 1s. 5½d. to 1s. 6½d. per gallon f.o.r.

SOLVENT NAPHTHA.—Unchanged at about 1s. 2½d. to 1s. 3d. per gallon.

HEAVY NAPHTHA.—Worth about 1s. 1d. per gallon f.o.r.

CREOSOTE OIL.—Remains at about 3d. to 3½d. per gallon f.o.r. in the North and at 4d. to 4½d. per gallon in London.

CRESYLIC ACID.—Unchanged at 1s. 8d. per gallon for the 98/100% quality, and at 1s. 6d. per gallon for the dark quality 95/97%.

NAPHTHALENES.—Quoted at £3 10s. to £3 15s. per ton for the firelighter quality, at about £4 to £4 5s. per ton for the 74/76 quality, and at about £5 per ton for the 76/78 quality.

PITCH.—Worth 37s. 6d. to 42s. 6d. per ton, f.o.b. East Coast port.

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### Nitrogen Fertilisers

*Sulphate of Ammonia.—Export.*—There has been very little demand during the past week, and prices remain unchanged.—*Home.*—Buyers have not yet commenced to cover their spring requirements, but a better demand is expected when the weather improves.

*Nitrate of Soda.*—Prices advanced for January according to schedule, but little business has been done.

### Latest Oil Prices

LONDON, January 14.—LINSEED OIL was steady at occasionally 2s. 6d. per ton advance. Spot, ex mill, £20; January to April, £16 12s. 6d.; May-August, £16 15s.; September-December, £17 2s. 6d., naked. RAPE OIL was quiet. Crude extracted, £29; technical refined, £30 10s., naked, ex wharf. COTTON OIL was slow. Egyptian, crude, £20 10s.; refined, common edible, £24; deodorized, £26, naked, ex mill. TURPENTINE was steady and unchanged. American, spot, 35s. 9d.; February-April, 36s. 6d.; Russian, spot, 33s. 3d. per cwt.

HULL.—LINSEED OIL.—Spot, £18; January, £17 12s. 6d.; February-April, £16 12s. 6d.; May-August, £16 12s. 6d.; September-December, £17 2s. 6d.; East Indian, spot, unquoted; Baltic, spot, £23 10s. per ton, naked. COTTON OIL.—Egyptian, crude, spot, £18 10s.; edible, refined, spot, £21; technical, spot, £21; deodorized, £23 per ton, naked. CASTOR OIL.—Spot, 39s.; firsts, 34s.; seconds, 32s. per ton. PALM KERNEL OIL.—Crude, 5½ per cent., spot, £23 per ton, naked. GROUNDNUT OIL.—Crushed/extracted, spot, £23; deodorized, spot, £27 per ton. SOYA OIL.—Extracted/crushed, spot, £22 10s.; deodorized, spot, £26 per ton. RAPE OIL.—Crushed/extracted, spot, £28; refined, spot, £30 per ton. COD OIL, 18s. 6d. per cwt. TURPENTINE steady at 38s. per cwt.

### South Wales By-Products

THERE is no improvement in South Wales by-product activities. The stoppage in the coalfield has practically killed the demand for certain products. The pitch market, owing to the coal trouble, is uncertain. The demand has shortened but prices are unchanged. There is a steady, but moderate, call for road tar, with values ranging between 13s. and 14s. per 40-gallon barrel delivered. Refined tars have also a fair market, with quotations for coke-oven and gasworks tar unchanged. Naphthas have scarcely any call. Patent fuel prices, for export, are:—21s. 6d., ex-ship Cardiff; 20s., ex-ship Newport and Swansea. Coke prices are:—Best foundry, 34s. to 36s. 6d.; good foundry, 26s. to 30s.; furnace, 17s. 6d. to 21s. 6d.

### Scottish Coal Tar Products

As many of the gas works are storing their production of crude tar until the beginning of the road season, with consequent reduction in the output of oils, etc., there has been a slight improvement in the value of certain products. Orders continue scarce, however, and no great increase is anticipated in the meantime.

*Cresylic Acid.*—A slight improvement is noticeable, but prices continue unaltered. Pale, 99/100%, 1s. 7d. to 1s. 8d. per gallon; pale, 97/99 %, 1s. 6d. to 1s. 7d. per gallon; dark, 97/99%, 1s. 5d. to 1s. 6d. per gallon; high boiling acid, 1s. 7d. to 1s. 9d. per gallon; all in bulk ex makers' works.

*Carbolic Sixties.*—With no orders passing price is nominal at 1s. 8d. to 1s. 10d. per gallon for best grades.

*Creosote Oil.*—Timber grades remain dull, but gas works oil is showing signs of improvement. Specification oil, 2½d. to 2¾d. per gallon; gas works ordinary, 3¼d. to 3⅜d. per gallon; washed oil, 3d. to 3¼d. per gallon; all f.o.r. works in bulk.

*Coal Tar Pitch.*—Business continues dull and values are not above 42s. 6d. to 45s. per ton f.a.s. Glasgow for export, and about 45s. per ton ex works for home trade.

*Blast Furnace Pitch.*—Dull with controlled prices unchanged at 30s. per ton f.o.r. works for home trade, and 35s. per ton f.a.s. Glasgow for export.

*Refined Coal Tar.*—Quotations are easy at 2⅞d. to 3¼d. per gallon f.o.r. in buyers' packages.

*Blast Furnace Tar* remains without interest at 2¾d. per gallon.

*Crude Naphtha.*—Supplies command 4¼d. to 4½d. per gallon, ex works.

*Water White Products.*—Conditions are unchanged. Motor benzole is 1s. 4d. to 1s. 4½d. per gallon; 90/160 solvent, 1s. 2d. to 1s. 3d. per gallon; 90/190 heavy solvent, 1s. to 1s. 0½d. per gallon; all in buyers' tanks ex makers' works.

### The Bouverie Players

OVER seven hundred pounds has been raised for charity as the result of three performances by the Benn Brothers' Dramatic Society (the Bouverie Players) at the New Scala Theatre during the present week. The play chosen this year was "Baa! Baa! Black Sheep," the well-known comedy by P. G. Wodehouse and Ian Hay, and the charities benefiting were the John Benn Hostel, the Furnishing Trades' Benevolent Association and the Electrical Trades' Benevolent Institution. Very hard work had been put in by Mr. H. T. Wrench (THE CHEMICAL AGE) as producer, and admirable casting secured a great success at each performance.

# Scottish Chemical Market

*The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing this firm's independent and impartial opinions.*

*Glasgow, January* 13, 1931.

THE Scottish heavy chemical market is showing reaction to the holiday period, business being more or less normal.

## Industrial Chemicals

ACETONE.—B.G.S.—£71 10s. to £80 per ton, ex wharf, according to quality. Inquiry remains satisfactory.

ACID, ACETIC.—Prices ruling are as follows: glacial, 98/100%, £47 to £58 per ton; pure, £37 5s. per ton; technical, 80%, £36 5s., delivered in minimum lots of 1 ton.

ACID, BORIC.—Granulated commercial, £22 per ton; crystals, £23; B.P. crystals, £31 per ton; B.P. powder, £32 per ton, in 1-cwt. bags, delivered free Great Britain in one-ton lots upwards.

ACID, HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. per carboy, ex works, full wagon loads.

ACID, NITRIC, 80° QUALITY.—£23 per ton, ex station, full truck loads.

ACID, OXALIC.—98/100%.—On offer at the same price, viz.: 3¼d. per lb., ex store. On offer from the Continent at 3¼d. per lb., ex wharf.

ACID, SULPHURIC.—£3 7s. 6d. per ton, ex works, for 144° quality; £5 15s. per ton for 168°. Dearsenicated quality, 20s. per ton extra.

ACID, TARTARIC, B.P. CRYSTALS.—Quoted 11¾d. per lb., less 5%, ex wharf. On offer for prompt delivery from the Continent at 1s. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Quoted at round about £8 15s. per ton, ex store.

ALUM, LUMP POTASH.—Now quoted £8 7s. 6d. per ton., c.i.f. U.K. ports. Crystal meal, about 2s. 6d. per ton less.

AMMONIA ANHYDROUS.—Quoted 10¼d. per lb., containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton. Powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. ports.

AMMONIA LIQUID, 80°.—Unchanged at about 2½d. to 3d. per lb., delivered, according to quantity.

AMMONIA MURIATE.—Grey galvanisers' crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Spot material obtainable at round about £31 per ton, ex wharf. On offer for shipment from China at about £29 per ton, c.i.f. U.K.

ARSENIC, WHITE POWDERED.—Quoted £21 per ton, ex wharf, prompt shipment from mines. Spot material still on offer at £22 5s. per ton, ex store.

BARIUM CHLORIDE.—In good demand and price about £10 10s. per ton, c.i.f. U.K. ports. For Continental materials our price would be £10 per ton, f.o.b. Antwerp or Rotterdam.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 15s. per ton, delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 15s. to £5 5s. per ton, according to quantity and point of delivery. Continental material on offer at £4 15s. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—At about £3 15s. per ton, f.o.r. works, or at £4 12s. 6d. per ton, f.o.b. U.K. ports.

FORMALDEHYDE, 40%.—Now quoted £33 per ton, ex store. Continental on offer at about £32 per ton, ex wharf.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 per ton, ex wharf.

LEAD, RED.—Price now £33 per ton, delivered buyers' works.

LEAD, WHITE.—Quoted £46 per ton, carriage paid.

LEAD, ACETATE.—White crystals quoted round about £38 to £39 per ton ex wharf. Brown on offer at about £2 per ton less.

MAGNESITE.—GROUND CALCINED.—Quoted £9 7s. 6d. per ton, ex store. In moderate demand.

METHYLATED SPIRIT.—Industrial quality 64 o.p. quoted 1s. 8d. per gallon less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb., delivered U.K. or c.i.f. Irish ports, with an allowance for contracts.

POTASSIUM CARBONATE.—Spot material on offer, £25 10s. per ton ex store. Offered from the Continent at £24 15s. per ton, c.i.f. U.K. ports.

POTASSIUM CHLORATE, 99¾/100% POWDER.—Quoted £25 per ton ex store; crystals 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £20 17s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton ex store.

POTASSIUM PERMANGANATE B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Spot material quoted 7d. per lb. ex store. Offered for prompt delivery from the Continent at about 6¾d. per lb. ex wharf.

SODA CAUSTIC.—Powdered 98/99%, £17 10s. per ton in drums, £18 15s. in casks. Solid 76/77% £14 10s. per ton in drums, £14 12s. 6d. per ton for 70/72% in drums, all carriage paid, buyer's station, minimum four-ton lots. For contracts 10s. per ton less.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—Quoted 3¾d per lb., delivered buyer's premises, with concession for contracts.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 7s. 6d. per ton extra. Light soda ash, £7 13s per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £9 2s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £15 per ton, ex station, minimum four-ton lots.

SODIUM NITRATE.—Chilean producers now offer at £9 18s. per ton, carriage paid, buyer's sidings, minimum six-ton lots, but demand in the meantime is small.

SODIUM PRUSSIATE.—Quoted 5¼d. per lb., ex store. On offer at 5d. per lb., ex wharf, to come forward.

SODIUM SULPHATE (SALTCAKE).—Prices, 60s. per ton, ex works; 65s. od. per ton, delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption: solid 61/62%, £10 per ton; broken, 60/62%, £11 per ton; crystals 30/32%, £8 2s. 6d. per ton, delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s. per ton; rock, £9 5s. per ton; ground American, £9 5s. per ton, ex store.

ZINC CHLORIDE 98%.—British material now offered at round about £18 per ton, f.o.b. U.K. ports.

ZINC SULPHATE.—Quoted £11 per ton, ex wharf.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

# New Chemical Trade Marks

## Applications for Registration

*These lists are specially compiled for us from official sources by Gee and Co., Patent and Trade Mark Agents, Staple House, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained, and to whom we have arranged to refer any inquiries relating to Patents, Trade Marks and Designs.*

*Opposition to the Registration of the following Trade Marks can be lodged up to January* 24, 1931.

SUPERSAN.

517,602. Class 2. Chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. Boots Pure Drug Co., Ltd., 37, Station Street, Nottingham; chemists and druggists. November 8, 1930. To be Associated with No. 517,438 (2,752) iii.

517,438. Class 3. Chemical substances prepared for use in medicine and pharmacy. Boots Pure Drug Co., Ltd., 37, Station Street, Nottingham; chemists and druggists. November 4, 1930. To be Associated with No. 517,602 (2,752) ii.

ANTRYPOL.

517,990. Class 3. Chemical substances prepared for use in medicine and pharmacy. British Dyestuffs Corporation, Ltd., Hexagon House, Blackley, Manchester; manufacturers. November 21, 1930.

PADUTIN.

517,917. Class 3. Chemical substances prepared for use in medicine and pharmacy. Bayer Products, Ltd., 31 to 34, Basinghall Street, London, E.C.2; merchants and manufacturers. November 19, 1930. To be Associated with No. 361,257 (1,890).

*Opposition to the Registration of the following Trade Marks can be lodged up to January* 31, 1931.

TETRONITE.

517,276. Class 1. Colourless waterproofing solutions (in the nature of paint) for application to the walls of buildings. Burt, Boulton and Haywood, Ltd., Salisbury House, London Wall, London, E.C.2; merchants and manufacturers. October 28, 1930.

## Manchester Chemical Market

(From Our Own Correspondent.)

*Manchester, January 15, 1931.*

The chemical market here, as with most other branches of trade activity at the present time, is carrying on under the threat of a vast widening of the cotton trade dispute. Last-minute efforts are being made to avert the trouble which, if it materialises, will have unpleasant consequences for chemical traders in this part of the country. Business in chemicals during the past week has, for the most part, been confined to moderate sized parcels for early deliveries, with no particular anxiety to enter into forward commitments, notwithstanding the fact that values of most lines appear to be fairly well stabilised.

### Heavy Chemicals

There is a moderate call for prussiate of soda, offers of which keep up at from 4¾d. to 5¼d. per lb., according to quantity. No more than a quiet business has been reported this week in the case of sulphide of sodium, with values of British make at round £10 10s. per ton for the 60-65 per cent. concentrated solid quality and £6 for the commercial product. A quietly steady trade is passing in bicarbonate of soda and quotations maintain their firmness at about £10 10s. per ton, in contracts. Chlorate of soda also is well held, although only moderate buying interest has been reported this week; prices are in the neighbourhood of £26 10s. per ton. Caustic soda is moving in fair quantities, mainly against contracts, which are quoted at from £12 15s. to £14 per ton, according to trade. There is some inquiry about for dibasic phosphate of soda, offers of which are at round £10 per ton. Sales of hyposulphite of soda at the moment are of quiet extent, but at £15 to £15 10s. per ton for the photographic quality and about £9 5s. for the commercial prices show little alteration compared with a week ago. Alkali is attracting a moderate amount of attention, and values are steady at £6 per ton. A quietly steady business is reported in respect of bichromate of soda on the basis of 3½d. per lb., less 1 to 2½ per cent. New business in saltcake this week has been on quiet lines, but prices are held at from £3 per ton.

Permanganate of potash meets with a slow demand still but quotations in this section keep up at about 5½d. per lb. for the B.P. quality and 5¼d. for the commercial. Yellow prussiate of potash is firm at from 6¾d. to 7¼d. per lb., according to grade, and a moderate weight of business is going through. There is a quiet demand about in the case of chlorate of potash, with current values at round £27 10s. per ton. Inquiry for caustic potash just now is rather subdued, although at about £29 per ton prices are reasonably steady. Bichromate of potash is moving in fair quantities and quotations are steady at 4¼d. per lb., less 1 to 2½ per cent. discount. A quiet trade is being done in carbonate of potash, current offers of which are at round £25 per ton.

Metal fluctutations have made no further impression on sulphate of copper prices; these are in the neighbourhood of £21 per ton, f.o.b., sales being of moderate extent. Arsenic is firm on continued comparative scarcity of supplies at from £19 to £19 10s. per ton at the mines for white powdered, Cornish makes. Acetate of lime is not too strong and buying interest in this material is slow; grey is quoted at £14 per ton and brown at £7 10s. A quiet business is being done in acetate of lead at about £35 per ton for the white and £34 or thereabouts for the brown material, with nitrate quoted at from £29 to £29 10s.

### Acids and Tar Products

A certain amount of easiness is still in evidence in the case of citric acid, values to-day ranging from 1s. 2d. to 1s. 2¼d. per lb. Tartaric acid, however, is on much the same level as a week ago, a quiet demand being reported at about 11½d. per lb. Oxalic acid shows little change on balance at £1 12s. per cwt., ex store. There is a fair movement of acetic acid and prices are firm at about £37 per ton for the 80 per cent. commercial product.

Among the by-products, moderate pitch sales are being made at round 40s. pet ton, f.o.b., with creosote oil in quiet demand at up to 4¼d. per fgallon, naked, according to quality. Offers of solvent naphtha this week have been at round 1s. 2½d. per gallon, at works. Carbolic acid is slow and easy at about 1s. 3d. per gallon for crude 60/s, and 5¼d. per lb., f.o.b., for crystals.

## Company News

Distillers Co., Ltd.—In addition to declaring the usual interim dividend on the 2,200,000 6 per cent. cumulative preference shares, the directors have announced an interim payment for the year to May 15, 1931, on the 10,690,962 £1 ordinary shares of 1s. 6d. per share (7½ per cent.), less tax, payable February 2.

British Glues and Chemicals, Ltd.—The directors announce that they consider that it is in the best interests of the company to defer payment of the interim preference dividend due on January 31.

Broken Hill South, Ltd.—According to cabled advices from Melbourne, the directors have, owing to the continued low price of metals, decided to pass the usual dividend. For the year to June 30 last, distributions totalling 32½ per cent. were made, including 10 per cent. declared at this time last year. The final payment for that year was 7½ per cent. but subsequent distributions have been reduced, that paid in August being 5 per cent., followed in November by 2½ per cent.

## Chemical Trade Inquiries

*The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.*

British India.—The Director-General, India Store Department, Belvedere Road, London, invites tenders by January 27 for 14,000 lb. acidum carbolicum, B.P., bismuthi subnitras carbonas, B.P., chloroformum, B.P., essential oils, dydrargyrum, B.P., hydrargyri subschloridum, iodum and iodoformum, B.P., potassii citras, B.P., sahtonimum, B.P., and sodii salicylas, B.P.

Egypt.—The Ministry of the Interior is calling for tenders to be presented in Cairo by February 25 for the supply of filters and other machinery for a water supply installation for the town of Chebim el Kom. (Ref. No. A.X. 10,704.)

The Egyptian Surveyor-General is calling for tenders to be presented in Giza (Mudiriya) by March 17, for the supply of sensitive paper and developing and acid fixing powder (Tender No. 2—4/25—1931–32). (Ref. No. B.X. 6,968.)

The Egyptian Department of Public Health requires tenders in Cairo by March 21, for supplies of laboratory articles. Local representation is essential. (Ref. No. C.X. 3,438.)

France.—An agent at Boulogne wishes to represent a British manufacturer of chemical products for use in the dyeing, perfumery, automobile and tanning industries. (Ref. No. 32.)

Persia.—The Imperial Persian Government is inviting tenders for supplying material for a beet sugar factory at Keredj, near Teheran, with a throughput of 300 tons. Inquiries should be addressed to the Commercial Attaché to the Imperial Persian Legation, 17, St. Helen's Place, London

## Tariff Changes

Belgium.—A law with retrospective effect as from December 3 doubles the consumption duties levied on certain kinds of alcohol, and the new rate on ethyl alcohols and spirits of all kinds is 800 francs per hectol. of alcohol (50 deg. Gay-Lussac at 15 deg. C.).

Chile.—The import duty on ethyl or sulphuric ether has been increased from 5 to 6 pesos per kilog.

Czechoslovakia.—The following increases in customs duties are in force as from December 15: Potash—containing up to 85 per cent. of carbonate of potassium, now 57 Cz. kr. per 100 kilogs (formerly 42¾); over 85 per cent. 108 (formerly 81); compressed yeast 550 (385); "Gay de Blau" liquefied 195 (45); soft soap with potassium base for manufacture of lysoform, subject to permit and control, 120 (70).

Spain.—As a provisional measure export duties on crude tartar products shipped from Spain have been fixed at the following rates: tartrates of lime, 20 pesetas (gold); crude tartars, 14·30 pesetas, and wine lees, 5·60 pesetas (gold), all per 100 kilogs.

# Commercial Intelligence

*The following are taken from printed reports, but we cannot be responsible for any errors that may occur.*

## County Court Judgment

*[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]*

SAN IT LABORATORIES, Belham Street, Camberwell, chemical compound manufacturers. (C.C., 17/1/31.) £10 9s. 4d. November 27.

## Mortgages and Charges

*[NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.]*

ALLIANCE ARTIFICIAL SILK, LTD, Oulton Broad. (M., 17/1/31.) Registered December 29, £11,000 debentures, part of £113,000; charged on land and buildings, at Oulton Broad, also general charge. *Nil. April 8, 1930.

BRITISH BOOKLET MATCHES (1928), LTD., London, N.W. (M., 17/1/31.) Registered January 1, £7,000 (not ex.) mortgage, to Lloyds Bank Ltd.; charged on New River Works, Brentfield Road, Willesden. *£7,630. October 14, 1929.

BROOKS AND WARBURTON (AMERICAN DRUG SUPPLY CO.), LTD., London, S.W. (M., 17/1/31.) Registered December 19, £5,000 debentures; general charge. *£7,308. February 14, 1930.

CAMPHYLENE CO., LTD., London, S.E., chemists. (M., 17/1/31.) Registered January 5, £600 debenture, to G. F. Fishenden, 28, Ferndale Road, Hove; general charge. *——. January 30, 1928.

HIGHWAYS COLLOIDAL, LTD., London, W., chemists. (M., 17/1/31.) Registered January 2, £1,752 debenture (subject to prior mort.), to A. F. Bott, Benington Lordship, Stevenage; general charge. *£5,000. March 25, 1929.

"L. AND N." COAL DISTILLATION, LTD., London, S.W. (M., 17/1/31.) Registered December 22, mortgage securing £15,514 4s. 7d. and further advances, to Sensible Heat Distillation, Ltd., Yorkmans, Petty France, S.W.; charged on certain letters patent, etc. *Nil. December 23, 1929.

MORDLE (F. DARE) AND CO., LTD., Carlton (Notts.), starch, chemical, etc., manufacturers. (M., 17/1/31.) Registered December 24, £750 debenture, to Mrs. M. Dare-Mordle, 6, Ebers Road, Nottingham; general charge; also registered December 24, debenture securing moneys which may be realised out of property belonging to L. Dare-Mordle, 186a, Musters Road, West Bridgford (the holder), charged by him for the benefit of the company by way of surety to J. T. and H. Bythway, Ltd., in respect of a current account; second general charge. *——. October 22, 1929.

NEWPORT PAGNELL GAS AND COKE CO., LTD. (M., 17/1/31.) Registered January 5, £250 debentures part of amount already registered; general charge. *£4,350. April 1, 1930.

NEWQUAY (CORNWALL) GAS CO., LTD. (M., 17/1/31.) Registered January 5, £350 debentures, part of amount already registered; charged on properties at Newquay, also general charge. *£4,000. May 14, 1930.

OLD STRAND CHEMICAL AND DRUG CO., LTD. (late OLD STRAND CHEMICAL AND TRADING CO., LTD.), London, E.C. (M., 17/1/31.) Registered January 5, £2,000 debenture, to H. A. Berens, The Nook, Mortimer Road, Ealing; general charge. *——. October 14, 1930.

SOMERTON GAS CO., LTD. (M., 17/1/31.) Registered January 3, £500 charge (dated December 23, 1930), to R. T. Gould and another. Glastonbury, solicitors; charged on properties at Somerton. *£1,500. January 6, 1931.

TAYLORS (CASH CHEMISTS) MIDLAND, LTD., Birmingham. (M., 17/1/31.) Registered December 31, £1,300 and £1,400 mortgages, to W. Ormerod, The Crossways, Harrogate, J.P., and others; charged on properties at West Bridgford and Wolverhampton, etc. *£47,120. March 20, 1930.

UNION COLD STORAGE CO., LTD., London, E.C. (M., 17/1/30.) Registered December 18, £500,000 charge, to the Public Trustee and executors; charged on premises at Alexandra Branch Dock No. 3, Bootle. *Nil. Ausust 15, 1930.

WALBROOK (ANGUS R.) AND CO., LTD., London, S.E., manufacturers of colours, paints, etc. (M., 17/1/31.) Registered December 31, £2,000 debenture and land registry charge and £4,000 Land Registry charge, to A. R. Walbrook, Manor Way, Croydon, and F. Love, XL House, Gt. Guildford Street, Southwark; charged on (1) properties in Tanner Street, Bermondsey, and general charge, and (2) properties in Tanner Street, Bermondsey. *Nil. January 22, 1929.

### Satisfactions

BRITISH BOOKLET MATCHES (1928), LTD., London, N.W. (M.S., 17/1/31.) Satisfaction registered December 30, all moneys, etc., registered. August 27, 1929.

JAGER (GEORGE) AND SON, LTD., Liverpool, sugar refiners. (M.S., 17/1/31.) Satisfaction registered December 31, £500, part of amount registered July 24, 1925.

PEARS (A. AND F.), LTD., Isleworth, soap manufacturers. (M.S., 17/1/31.) Satisfaction registered December 23, £2,500, part of amount outstanding July 1, 1908.

UNION COLD STORAGE CO., LTD., London, E.C. (M.S., 17/1/31.) Satisfaction registered January 2, £260,000 (not ex.), registered August 16, 1922.

## Declarations of Solvency

*[Registered under Section 230 of the Companies Act, 1929. It must be understood that (a) a company which has filed a Declaration of Solvency may be proposing to wind up with a view to reconstruction, and (b) it does not necessarily follow that a company which has filed such declaration will actually pass a resolution to wind up.]*

DENNY CHEMICAL ENGINEERING CO., LTD., 46/47, London Wall, E.C.2. Declaration of solvency filed January 7, 1931.

EASTERN ASBESTOS-CEMENT CO., LTD., 32, Sackville Street, Piccadilly, W.1. Declaration of solvency filed January 2, 1931.

PILCHERS, LTD. (formerly J. G. AND J. PILCHER AND SONS, LTD.), Morgans Lane, Tooley Street, S.E.1, oil, colour, paint, white lead and varnish merchants, manufacturers, etc. Declaration of solvency filed January 7, 1931.

## London Gazette, &c.

### Winding-Up Petitions

ATLAS ARTIFICIAL SILK PROCESSES, LTD. (W.U.P., 17/1/31.) A petition for the winding-up of this company was, on January 2, presented by Johnson Matthey and Co., Ltd., melters and assayers, of 73–82, Hatton Garden, E.C.1, a creditor, and is to be heard at the Royal Courts of Justice, Strand, London, on January 19.

DAMMANN ASPHALT COMPANY (GREAT BRITAIN), LTD. (W.U.P., 17/1/31.) A petition for the winding-up of this company was presented on January 7, and is to be heard at the Royal Courts of Justice, Strand, London, on January 19.

### Company Winding Up

VULCAN COPPER MINES, LTD. (C.W.U., 17/1/31.) Statutory meetings on January 20 at the Lecture Hall, Kingsway Hall, Kingsway, London, W.C.2; creditors, 11.30 a.m., and contributories, 12 noon.

### Company Winding Up Voluntarily

EASTERN ASBESTOS-CEMENT CO., LTD. (C.W.U.V., 17/1/31.) By special resolution, January 5. G. M. Mills, of 32, Sackville Street, London, W.1, appointed as liquidator.